

DRIVE/TRANSMISSION 6

SUBJECT	PAGE NO.
6.1 Specifications	6-1
6.2 Primary Chain	6-3
6.3 Secondary Drive Belt	6-6
6.4 Clutch Release Mechanism	6-8
6.5 Primary Drive/Clutch	6-10
6.6 Transmission	6-17
6.7 Transmission Case	6-19
6.8 Shifter Forks and Drum	6-21
6.1 Mainshaft and Countershaft	6-24
6.10 Main Drive Gear	6-30
6.11 Access Door Bearings	6-32
6.12 Right Transmission Case Bearings	6-33
6.13 Transmission Installation and Shifter Pawl Adjustment	6-34

SPECIFICATIONS

6.1

TRANSMISSION		
Transmission type	5 forward speed, foot shift	
Clutch type	Wet – multiple disc	
Clutch fluid capacity	1.0 quart	0.95 liter
Fluid part no.-quart	98854-96	
Fluid part no.-gallon	98855-96	

PRIMARY DRIVE (ENGINE-TO-TRANSMISSION)	
Engine sprocket	35 teeth
Clutch sprocket	56 teeth
Ratio	1.60: 1

TRANSMISSION GEAR RATIOS	FINAL*	OVERALL**
First (low) gear	2.69	9.717
Second gear (1999 Models)	1.97	7.118
Second gear (2000 Models)	1.85	6.687
Third gear	1.43	5.180
Fourth gear	1.18	4.269
Fifth (high) gear	1.00	3.615

FINAL DRIVE (TRANSMISSION-TO-REAR WHEEL)	
Transmission sprocket	27 teeth
Rear wheel sprocket	61 teeth
Secondary drive belt	128 teeth
Ratio	2.26:1

*Final gear ratios indicate number of mainshaft revolutions required to drive output sprocket one revolution.

**Overall gear ratios indicate number of engine revolutions required to drive rear wheel one revolution.

CLUTCH PLATE	NUMBER REQUIRED	NEW COMPONENT THICKNESS		SERVICE WEAR LIMITS (MINIMUM THICKNESS)	
		IN.	MM	IN.	MM
Friction plate (fiber)	8	0.0866 + 0.0031	2.1996 + 0.0787	0.006	0.152
Steel plate	6	0.0629 + 0.0020	1.5977 + 0.0508	0.006	0.152
Clutch pack				0.661 minimum	16.789 minimum

NOTE

Service wear limits are given as a guideline for measuring components that are not **new**. For measurement specifications not given under SERVICE WEAR LIMITS, see NEW COMPONENTS.

TORQUE VALUES

ITEM	TORQUE		NOTES
Access door mounting bolts	13-17 ft-lbs	17.6-23.0 Nm	LOCTITE THREADLOCKER 243 (blue), page 6-34
Clutch inspection cover TORX screws with washers	7-9 ft-lbs	9.5-12.2 Nm	page 6-3
Clutch mainshaft nut	70-80 ft-lbs	94.9-108.5 Nm	LOCTITE THREADLOCKER 262 (red), left hand threads, page 6-16
Countershaft retainer TORX screw	13-17 ft-lbs	17.6-23.0 Nm	LOCTITE THREADLOCKER 243 (blue), page 6-29
Engine sprocket nut	190-210 ft-lbs	257.6-284.7 Nm	LOCTITE THREADLOCKER 262 (red), page 6-16
Footpeg bolts	10-15 ft-lbs	13.6-20.3 Nm	page 6-7
Isolator bolt	100-110 ft-lbs	135.6-149.1 Nm	LOCTITE THREADLOCKER 262 (red), page 6-7
Primary chain adjuster locknut	10-12 ft-lbs	13.6-16.3 Nm	on interior of chaincase, page 6-4
Primary chain adjuster locknut	20-25 ft-lbs	27.1-33.9 Nm	on exterior of chaincase, page 6-4
Primary chain inspection cover screws	40-60 in-lbs	4.5-6.8 Nm	page 6-3
Primary cover bolts (1999 Models)	80-110 in-lbs	9.0-12.4 Nm	3 lengths, page 6-5
Primary cover bolts (2000 Models)	100-120 in-lbs	11-14 Nm	3 lengths, page 6-5
Shifter lever pinch screw	100-120 in-lbs	11.3-13.6 Nm	page 6-5
Shifter shaft assembly locknuts	90-110 in-lbs	10.2-12.4 Nm	bottom nut first, same torque for top, page 6-34
Sideplate screws	19 ft-lbs	25.8 Nm	page 6-7
Transmission detent plate nut	13-17 ft-lbs	17.6-23.0 Nm	page 6-23
Transmission drain plug	14-21 ft-lbs	19.0-28.5 Nm	remove debris from end, page 6-5
Transmission sprocket nut	See note	See note	LOCTITE THREADLOCKER 262 (red), left hand threads, special torque turn method, page 6-35
Transmission sprocket screws	90-110 in-lbs	10.2-12.4 Nm	replace after 3 removals, page 6-36

GENERAL

An opening between the primary drive and transmission compartments allows the same lubricant supply to lubricate moving parts in both compartments.

Since the primary chain runs in lubricant, little service will be required other than checking lubricant level and chain tension. If, through hard usage, the primary chain does become worn, it must be replaced. Remove and install the chain following the procedure under 6.5 PRIMARY DRIVE/CLUTCH.

ADJUSTMENT/LUBRICATION

See 1.15 PRIMARY CHAIN for inspection and adjustment procedures.

See 1.12 CLUTCH for complete lubrication service on the primary chain.

REMOVAL

Primary Cover

⚠ WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

1. Raise rear wheel off floor using REAR WHEEL SUPPORT STAND (Part No. B-41174).
2. Remove muffler. See 2.35 EXHAUST SYSTEM.
3. See Figure 6-1. Place a drain pan under the engine. Remove drain plug (9) and drain lubricant from primary drive.

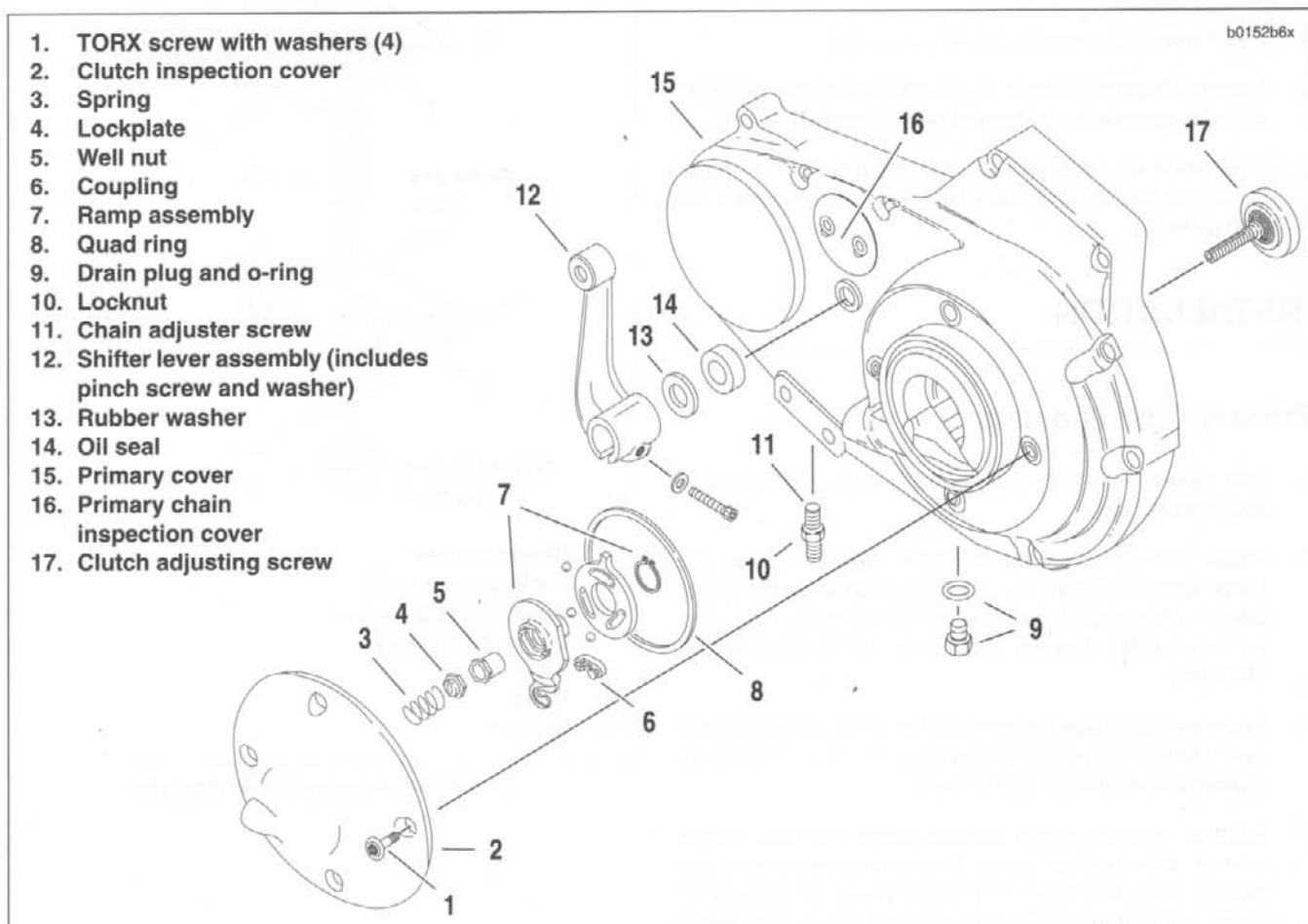


Figure 6-1. Primary Cover

4. Remove shifter lever assembly (12) and rubber washer (13). Do not scratch primary cover (15).
5. Add freeplay to clutch cable. See 1.12 CLUTCH.
6. Loosen locknut (10). Turn chain adjuster screw (11) counterclockwise (outward) to relax primary chain tension.
7. Remove four TORX screws with washers (1) and clutch inspection cover (2). Remove and discard Quad ring (8) from groove in primary cover.
8. Slide spring (3) with attached hex lockplate (4) from flats of clutch adjusting screw (17).
9. Turn clutch adjusting screw (17) clockwise to release ramp and coupling mechanism. As the adjusting screw is turned, ramp assembly (7) moves forward. Unscrew well nut (5) from end of adjusting screw.
10. Remove hook of ramp from button to the rear of cable end coupling (6). Remove cable end from slot in coupling. Remove coupling and ramp assembly.
11. Remove screws which secure primary cover. Remove cover and gasket. Discard gasket.
12. Remove and discard shifter lever oil seal (14).

Primary Chain Adjuster

1. See Figure 6-2. Remove primary cover (1).
2. Remove locknut (2) from chain adjuster screw (3). Turn adjuster screw out of threaded boss in primary cover.
3. Slide shoe (6) off plate (5) (shoe must be slid off plate toward closed or blind side of shoe). Remove locknut (4) and plate (5).

INSTALLATION

Primary Chain Adjuster

1. See Figure 6-3. If shoe (6) is badly worn, replace it or adjust assembly.
2. Install plate (5) over top of chain adjuster screw (3). Place spacer (7) over top of adjuster screw next to plate. Secure plate and spacer to adjuster screw by threading on locknut (4). Tighten locknut to 10-12 ft-lbs (13.6-16.3 Nm).
3. Place plate into slots at open end of shoe (6). Slide shoe over plate until locknut at top end of adjuster screw is against closed (blind) side of shoe.
4. Position adjuster inside primary cover (1) with closed side of shoe against cover. Thread adjuster screw into tapped boss at bottom of primary cover. At outside of cover, install locknut (2) onto adjuster screw with nylon sealing surface toward cover. Tighten to 20-25 ft-lbs (27.1-33.9 Nm).
5. Install primary cover.

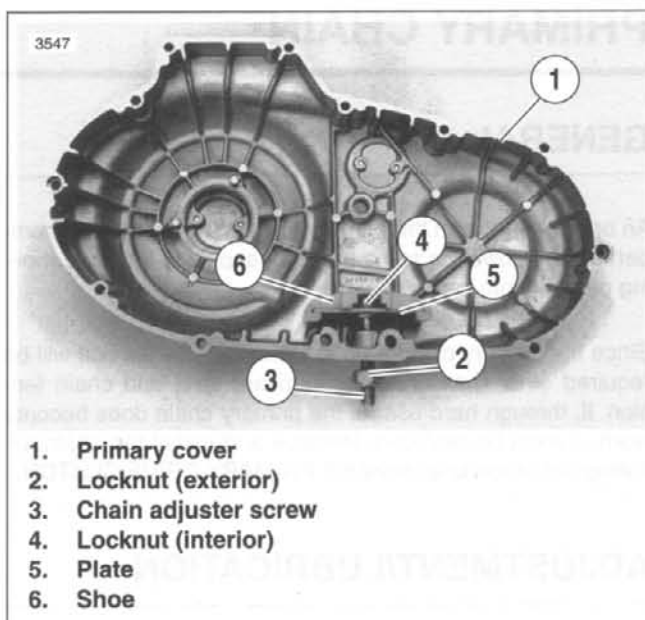


Figure 6-2. Removing Primary Chain Adjuster

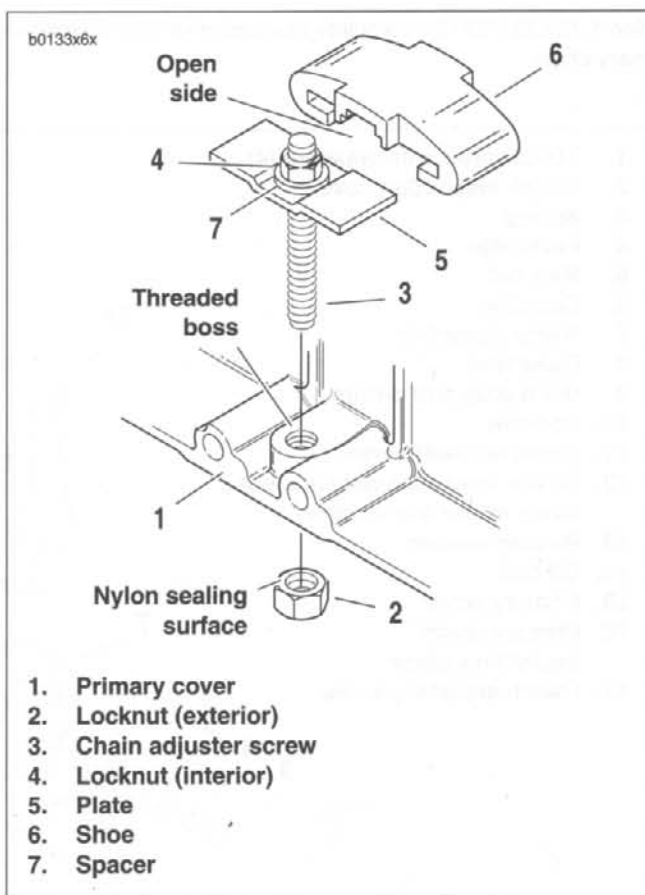


Figure 6-3. Primary Chain Adjuster

Primary Cover

1. Remove foreign material from magnetic drain plug. Install plug and tighten to 14-21 ft-lbs (19.0-28.5 Nm).
2. Wipe gasket surface clean. Install **new** gasket on primary cover.
3. See Figure 6-4. Install primary cover and gasket onto left crankcase half using mounting bolts.
 - a. **1999 Models:** Tighten bolts to 80-110 in-lbs (9.0-12.4 Nm).
 - b. **2000 Models:** Tighten bolts to 100-120 in-lbs (11-14 Nm).
4. See Figure 6-1. Install **new** shifter lever oil seal (14).
5. Fit coupling (6) over cable end with rounded side inboard, the ramp connector button outboard. With retaining ring side of ramp assembly facing inward, place hook of ramp (7) around coupling button and rotate assembly counterclockwise until tang on inner ramp fits in slot of primary cover.
6. Thread well nut (5) on adjusting screw (17) until slot of screw is accessible with a screwdriver. Fit well nut hex into recess of outer ramp and turn adjusting screw counterclockwise.
7. Fill transmission to proper level with fresh lubricant. See 1.12 CLUTCH.
8. Adjust clutch. See 1.12 CLUTCH.
9. Adjust primary chain tension. See 1.15 PRIMARY CHAIN.
10. Install rubber washer (13) and shifter lever assembly (12).
11. See Figure 6-5. Shifter lever (2) must bisect primary chain inspection cover (1). Tighten pinch screw (3) to 100-120 in-lbs (11.3-13.6 Nm).
12. Install muffler. See 2.35 EXHAUST SYSTEM.

WARNING

Always connect positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

13. Connect battery cables, positive cable first.

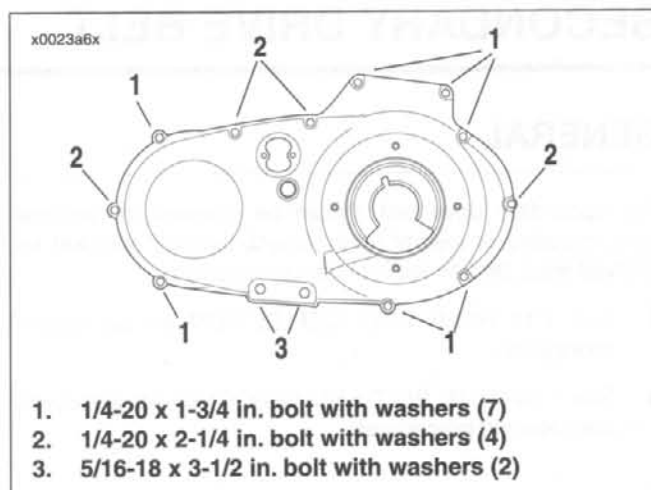


Figure 6-4. Install Primary Cover Bolts

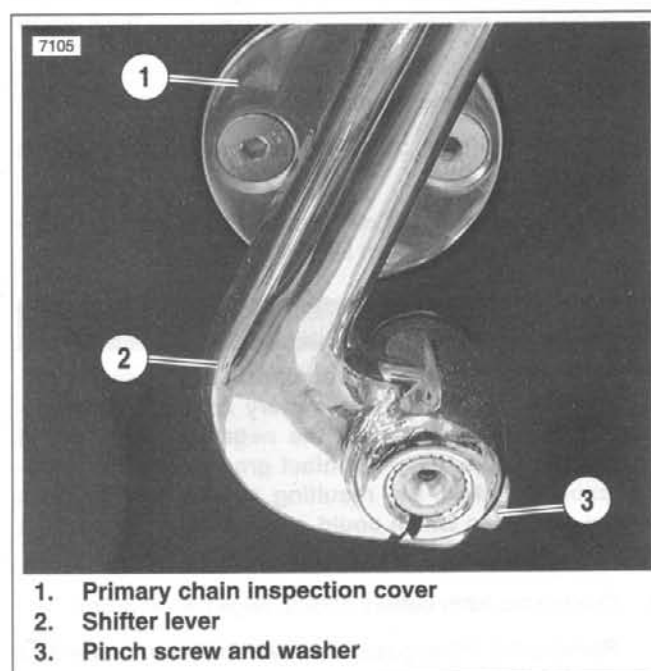


Figure 6-5. Shifter Lever

GENERAL

The secondary drive belt should be checked for unusual wear, cracking or loss of teeth. Check the belt sprocket for unusual wear, broken teeth or damaged flange.

- See 1.13 REAR BELT DEFLECTION for adjustment information.
- See 1.14 REAR BELT AND SPROCKET for inspection and cleaning procedures.

REMOVAL

Belt removal requires special lifts to support the motorcycle. If you do not have the proper equipment, have your Buell dealer perform the repair.

1. Lift and secure the motorcycle.
 - a. Place vehicle on a lift and anchor front wheel in place.
 - b. Raise rear wheel off lift using REAR WHEEL SUPPORT STAND (Part No. B-41174).

⚠ WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

2. Disconnect **both** battery cables, negative cable first.
3. Remove the stone guard and lower belt guard. See 2.41 BELT GUARDS.
4. Remove chin fairing. See 2.42 CHIN FAIRING
5. Remove sprocket cover. See 2.42 CHIN FAIRING.
6. Remove rear fender. See 2.40 REAR FENDER.
7. See Figure 6-6. Remove rear wheel.
 - a. Remove rear axle nut (1) (metric), lockwasher (2), washer (3) and right side axle carrier (4).
 - b. Hold axle adjuster bolt (5) with a 5/16 in. wrench. Loosen locknut (6) and axle adjusters (7). Repeat on left side.
 - c. From left side, slowly pull rear axle from swingarm. As axle is removed, remove right side spacer, rear brake caliper mount, left side axle carrier and washer. Suspend rear brake caliper mount from frame with a piece of rope. Push rear wheel forward and slip off belt.
8. See Figure 6-7. Loosen isolator bolt (1) until rubber isolator is able to be rotated. Do not remove bolt.

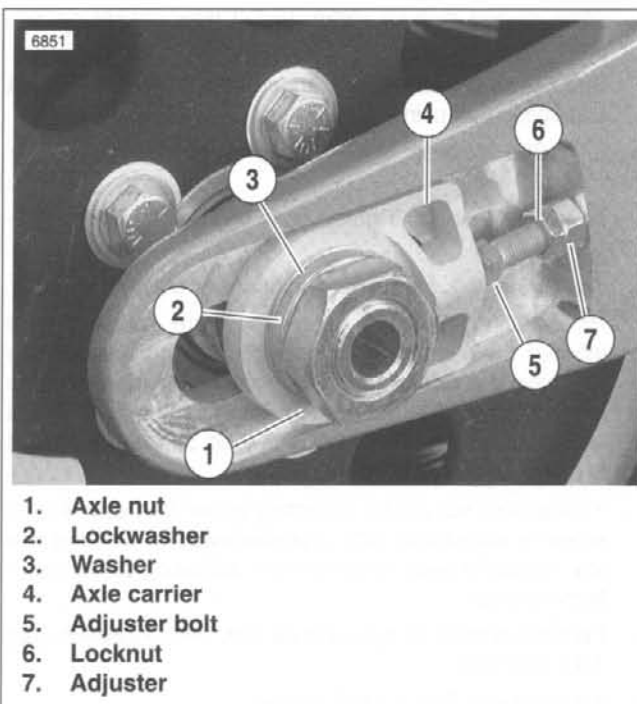


Figure 6-6. Rear Axle, Right Side

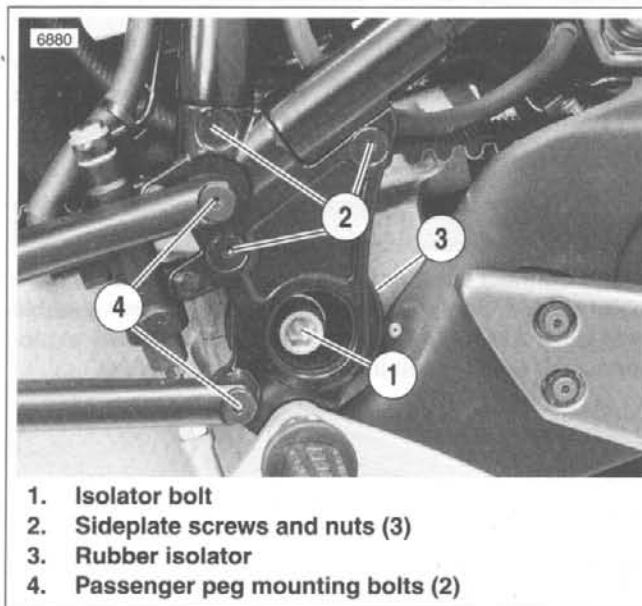


Figure 6-7. Sideplate

9. Remove right side passenger peg mounting bolts (4).
10. Remove the three allen screws and nuts (2) from the sideplate. Detach the sideplate using special care to watch how the rear brake line is twisted.
11. Slide the drive belt from the sprockets between the frame and rubber isolator.
12. Inspect belt and sprockets. See 1.14 REAR BELT AND SPROCKET.

INSTALLATION

1. Slide a **new** belt over the sprockets.

CAUTION

- Use caution when installing isolator bolts. Make sure isolator bolt hole is aligned with threaded hole in bearing adjusting bolt to avoid cross-threading bolt.
- Observe seam on rubber isolator after isolator bolt is tightened. If seam twists, apply more **LOCTITE ANTI-SEIZE** to underside of isolator bolt heads. Failure to comply will result in damage to rubber isolators. See Figure 6-9.

2. See Figure 6-8. Install rubber isolators (4).
 - a. Apply **LOCTITE THREADLOCKER 262** (red) to isolator bolt threads.
 - b. Apply **LOCTITE ANTI-SEIZE** to bottom of isolator bolt head.
 - c. Align metal pin (3) with frame and hole in isolator.
 - d. Install isolator bolts (1) and washers (2) through isolators (4) and into the mount.
 - e. Tighten to 100-110 ft-lbs (135.6-149.1 Nm).
 - f. See Figure 6-9. After tightening isolator bolts, verify that seam on isolators is perpendicular to swingarm mount block.
3. Install rear fender. See 2.40 REAR FENDER.
4. Align the **new** belt and rear wheel. See 1.13 REAR BELT DEFLECTION.
5. Install sprocket cover.
6. See Figure 6-7. Install sideplate and right side passenger peg mount.
 - a. Tighten sideplate screws (2) to 19 ft-lbs (25.8 Nm).
 - b. Tighten peg bolts (4) to 10-15 ft-lbs (13.6-20.3 Nm).
7. Install chin fairing. See 2.42 CHIN FAIRING.
8. Install stone guard and belt guard. See 2.41 BELT GUARDS.

WARNING

Always connect positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

9. Connect battery cables, positive cable first.

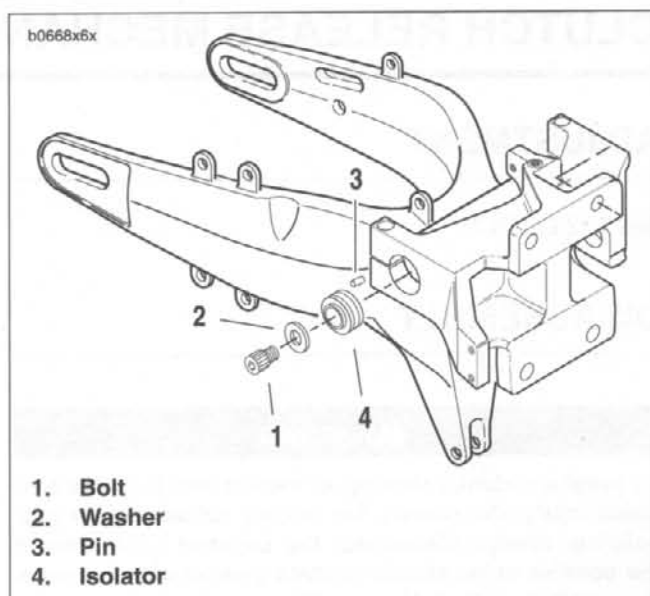


Figure 6-8. Installing Isolators

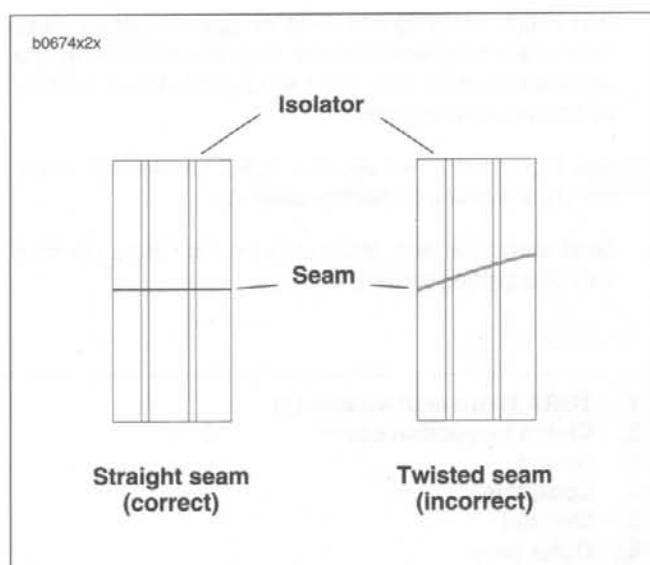


Figure 6-9. Isolator Alignment

CLUTCH RELEASE MECHANISM

6.4

ADJUSTMENT

See 1.12 CLUTCH.

DISASSEMBLY

⚠ WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

1. Pull clutch cable ferrule (end of cable housing) away from clutch hand lever bracket. Gap between ferrule and bracket should be 1/16-1/8 (1.6-3.2 mm). Adjust freeplay by turning cable adjuster.
2. See Figure 6-10. Remove four TORX screws with washers (1) and clutch inspection cover (2).
3. Slide spring (3) with attached screw lockplate (4) from flats of adjusting screw (12).

4. Turn adjusting screw (12) clockwise to release ramp and coupling mechanism. As the adjusting screw is turned, ramp assembly moves forward. Unscrew nut (5) from end of adjusting screw.
5. Remove hook of ramp from cable end coupling (16). Remove cable end (10) from slot in coupling.
6. Remove and discard retaining ring (13) from ramp assembly to separate inner and outer halves. Remove three balls (7) from ramp sockets.

CLEANING, INSPECTION AND REPAIR

1. Thoroughly clean all parts in cleaning solvent.
2. See Figure 6-10. Inspect three balls (7) of release mechanism and ball socket surfaces of inner and outer ramps for wear, pitting, surface breakdown and other damage. Replace parts as necessary.
3. Check hub fit of inner (15) and outer (6) ramps. Replace ramps if excessively worn.
4. Check clutch cable for frayed or worn ends. Replace cable if damaged or worn.
5. Change or add transmission fluid if necessary. See 1.12 CLUTCH.

1. TORX screw with washer (4)
2. Clutch inspection cover
3. Spring
4. Lockplate
5. Well nut
6. Outer ramp
7. Ball (3)
8. O-ring
9. Cable end fitting
10. Clutch cable end
11. Primary cover
12. Clutch adjusting screw
13. Retaining ring
14. Quad ring
15. Inner ramp
16. Coupling

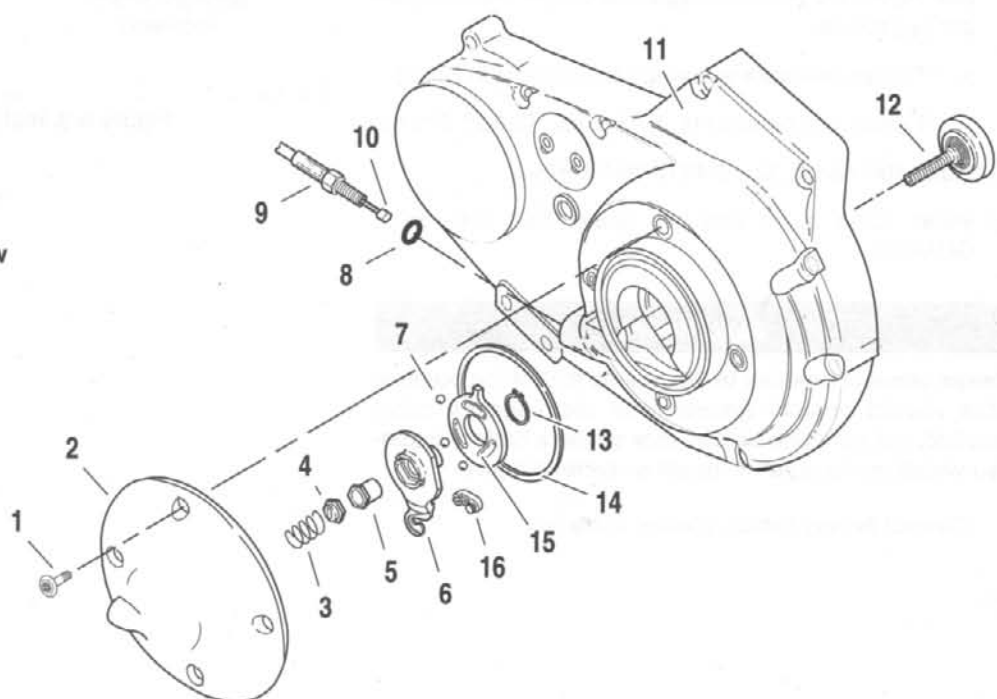
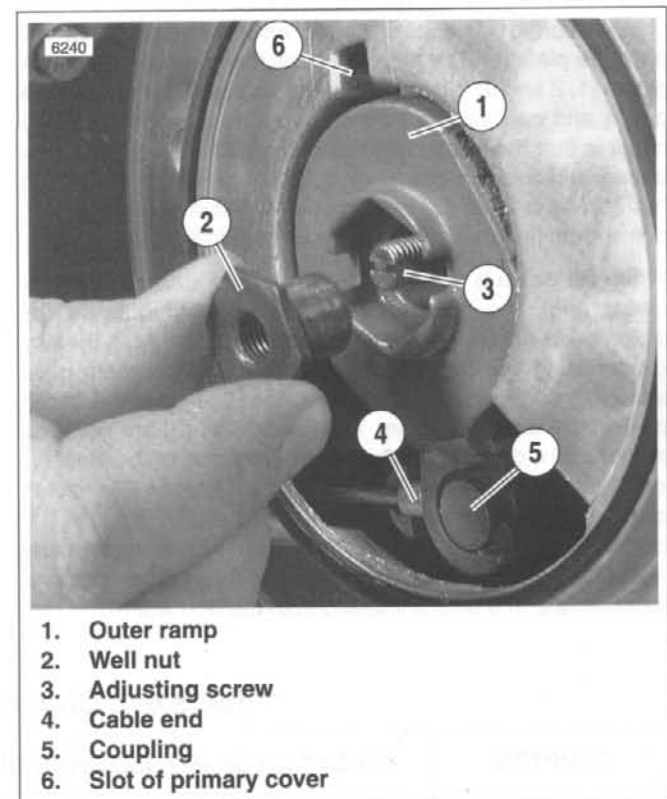
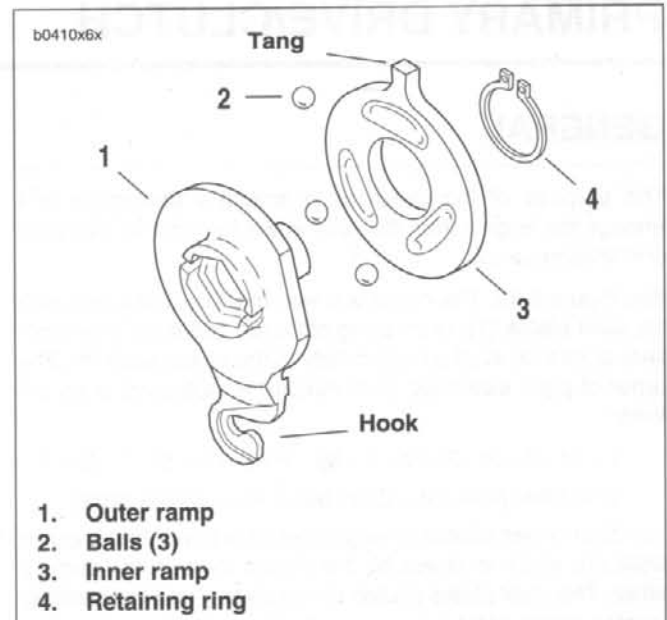


Figure 6-10. Clutch Release Mechanism

ASSEMBLY

1. See Figure 6-11. Assemble inner and outer ramp.
 - a. Apply multi-purpose grease to balls (2) and ramps (1, 3).
 - b. Insert balls in sockets of outer ramp (1).
 - c. Install inner ramp (3) on hub of outer ramp (1) with tang 180° from hook of outer ramp.
 - d. Install **new** retaining ring (4) in groove of outer ramp hub.
2. See Figure 6-12. Install ramp assembly.
 - a. Fit coupling (5) over cable end (4) with rounded side inboard, the ramp connector button outboard.
 - b. With retaining ring side of ramp assembly facing inward, place hook of ramp around coupling button.
 - c. Rotate assembly counterclockwise until tang on inner ramp fits in slot of primary cover (6).
3. Secure assembly in place.
 - a. Thread well nut (2) on adjusting screw (3) until slot of screw is accessible with a screwdriver.
 - b. Fit nut hex into recess of outer ramp (1).
 - c. Turn adjusting screw counterclockwise until resistance is felt.
4. Adjust clutch release mechanism. See 1.12 CLUTCH.



GENERAL

The purpose of the clutch is to smoothly disengage and engage the engine from the rear wheel for starting, stopping and shifting gears.

See Figure 6-13. The clutch is a wet, multiple-disc clutch with six steel plates (1), one spring plate (2) and eight fiber (friction) plates (3) stacked alternately in the clutch shell (4). The order of plate assembly, from inboard to outboard, is as follows:

F - St - F - St - F - St - F - **Sp** - F - St - F - St - F - St - F
(F = Fiber plate, St = Steel plate, **Sp** = Spring plate)

The fiber plates (clutch driving plates) are keyed to the clutch shell (4), which is driven by the engine through the primary chain. The steel plates (clutch driven plates) and the centrally located spring plate (also a clutch driven plate) are keyed to the clutch hub (5), which drives the rear wheel through the transmission and secondary drive belt.

When the clutch is engaged (clutch lever released), the diaphragm spring (7) applies strong inward force against the pressure plate (6). The pressure plate then presses the clutch plates (1, 2 and 3) together, allowing no slippage between the plates and causing the plates to turn as a single unit. The result is that the rotational force of the clutch shell (4) is fully transmitted through the "locked" clutch plates to the clutch hub (5). As long as the transmission is set in a forward gear, power from the engine will be transmitted to the rear wheel.

When the clutch is disengaged (clutch lever pulled to left handlebar grip), the pressure plate (6) is pulled outward (by clutch cable action) against the diaphragm spring (7), thereby compressing the diaphragm spring. With the pressure plate retracted, strong inward force no longer squeezes the clutch plates (1, 2 and 3) together. The fiber plates (3) are now free to rotate at a different relative speed than that of the steel (1) and spring (2) plates (i.e. - slippage between the clutch plates occurs). The result is that the rotational force of the clutch shell (4) is no longer fully transmitted through the "unlocked" clutch plates to the clutch hub (5). The engine is free to rotate at a different speed than the rear wheel.

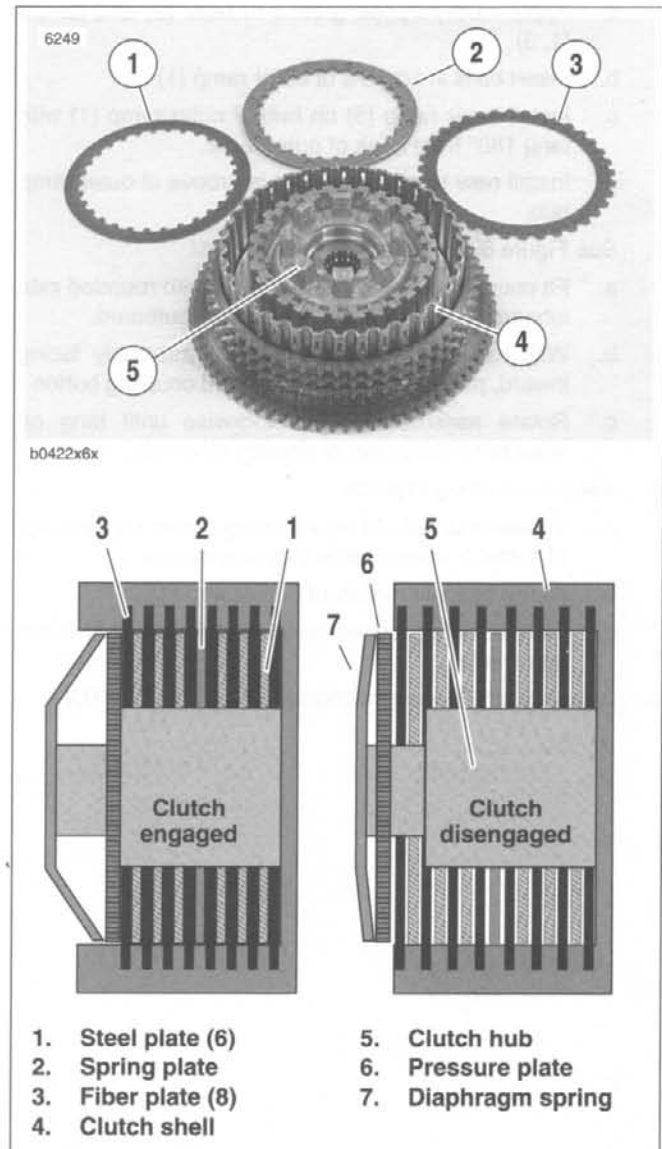


Figure 6-13. Clutch Plates and Hub/Shell Assembly

Table 6-1. Clutch Troubleshooting

SYMPTOM	CAUSE (CHECK IN FOLLOWING ORDER)	REMEDY
Clutch slips.	Incorrect clutch release adjustment. Worn clutch plates.	Check and adjust clutch release mechanism. Check service wear limits. Replace plates.
Clutch drags.	Incorrect clutch release adjustment. Worn clutch release ramps or balls. Warped clutch steel plates. Blade worn or damaged clutch gear splines. Overfilled primary.	Check and adjust clutch release mechanism. Replace release ramps and/or balls. Replace clutch steel plates. Replace clutch gear or hub as required. Drain lubricant to correct level.

REMOVAL/DISASSEMBLY

Clutch Pack

WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

1. Remove primary cover. See 6.2 PRIMARY CHAIN.

WARNING

Do not attempt to disassemble the clutch without SPRING COMPRESSING TOOL (Part No. HD-38515-A), CLUTCH SPRING FORCING SCREW (Part No. HD-38515-91) and proper eye protection. Otherwise, the highly compressed diaphragm spring could fly out with great force, which could result in death or serious injury.

2. See Figure 6-14. Attach tools to compress clutch diaphragm spring.
 - a. Thread the CLUTCH SPRING FORCING SCREW (Part No. HD-38515-91) (1) onto the clutch adjusting screw.
 - b. Place the bridge (2) of SPRING COMPRESSING TOOL (Part No. HD-38515-A) against diaphragm spring (6).
 - c. Install bearing (3) and washer (4).
 - d. Thread the tool handle (5) onto end of forcing screw.

CAUTION

See Figure 6-15. Turn compressing tool handle (5) only the amount required to release spring seat (9) and remove snap ring (8). Excessive compression of diaphragm spring (6) could damage clutch pressure plate (7).

3. Remove pressure plate assembly.
 - a. Place a wrench on the clutch spring forcing screw (1) flats to prevent the forcing screw from turning.
 - b. Turn compressing tool handle (5) clockwise until tool relieves pressure on snap ring (8) and spring seat (9). Remove and discard snap ring (8).
 - c. Unseat spring seat (9) from the groove in clutch hub prongs.
 - d. Remove pressure plate assembly.
4. See Figure 6-16. Remove the clutch pack from the hub/shell assembly. The pack consists of eight fiber plates (18), six steel plates (19) and a spring plate (20).

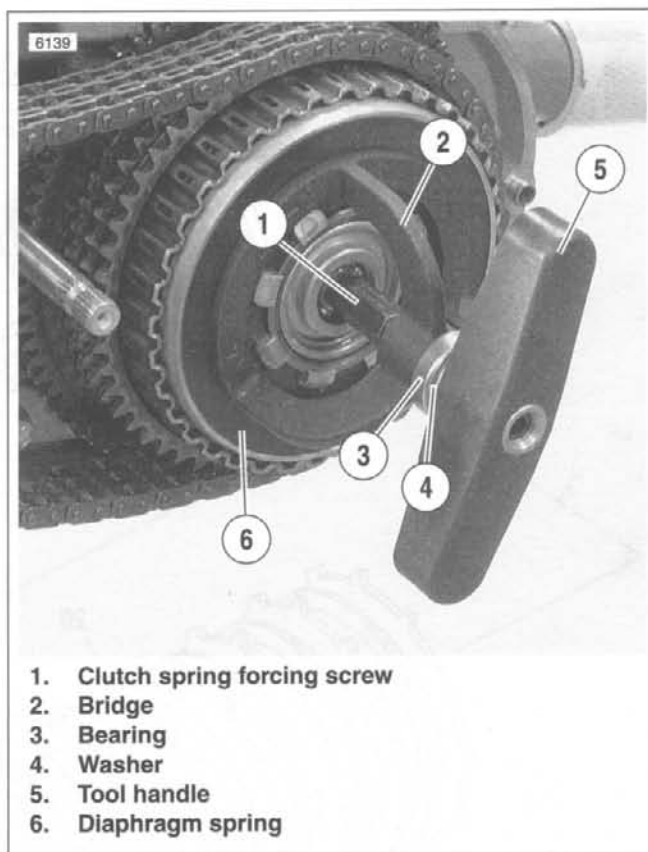


Figure 6-14. Compressing Clutch Diaphragm Spring

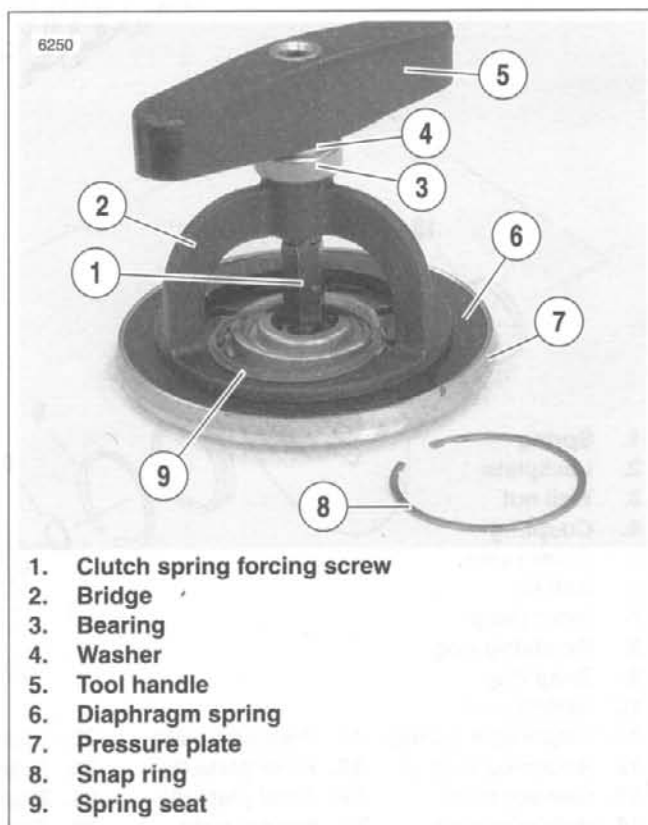


Figure 6-15. Pressure Plate Assembly

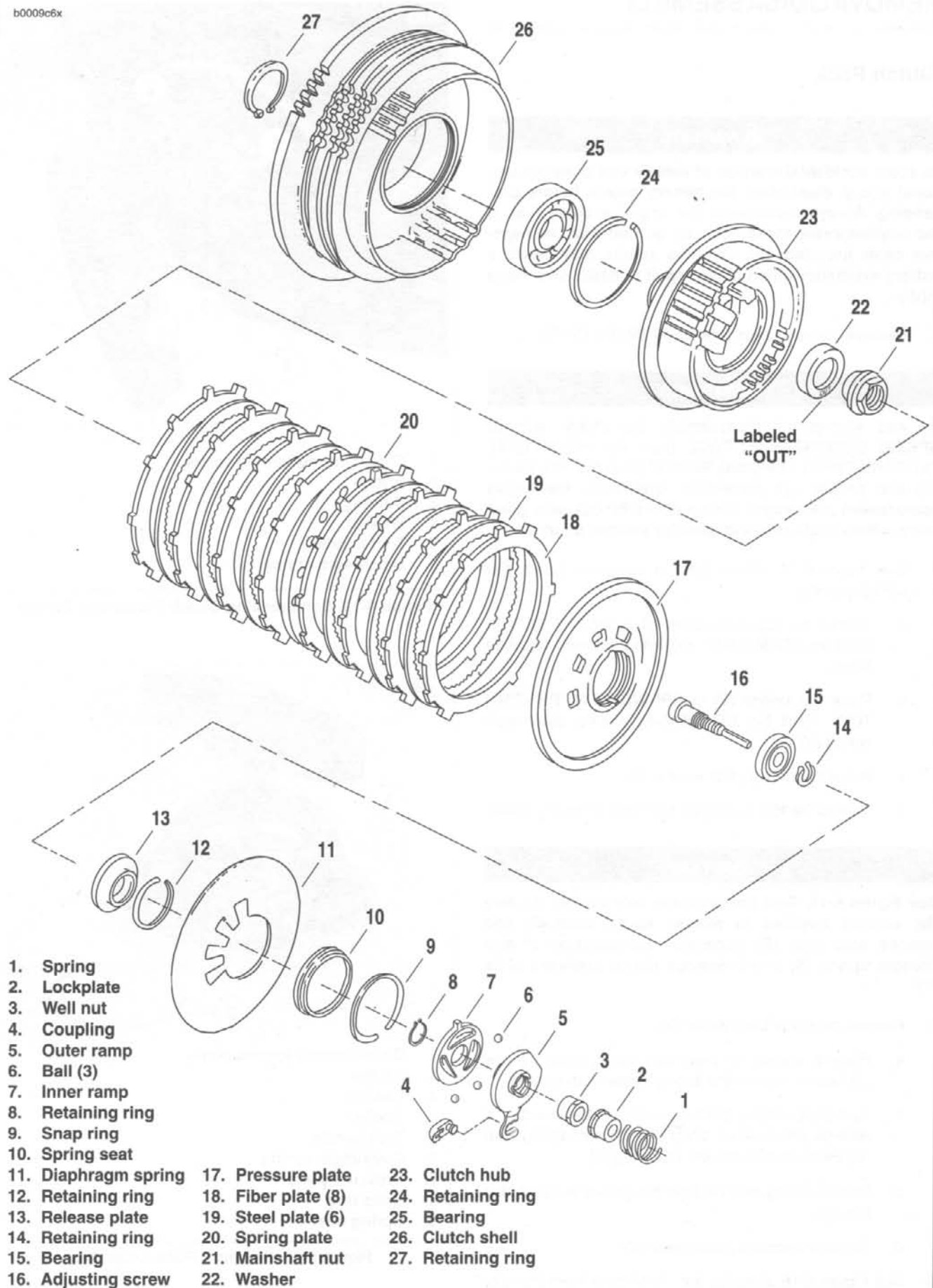


Figure 6-16. Clutch Assembly

Primary Chain/Drive

WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

1. Remove primary cover. See 6.2 PRIMARY CHAIN.
2. Loosen engine sprocket.
 - a. Install SPROCKET LOCKING LINK (Part No. HD-38362).
 - b. Remove the engine sprocket nut.
 - c. Loosen, but do not remove, engine sprocket. If necessary, use the slotted portion of TWO CLAW PULLER (Part No. HD-97292-61) and two bolts to loosen the engine sprocket.
3. See Figure 6-17. Remove adjusting screw assembly.
 - a. Remove large retaining ring (1).
 - b. Remove adjusting screw assembly (2, 3 and 4) from pressure plate.

CAUTION

See Figure 6-16. Mainshaft nut (21) has left-hand threads. To prevent damage, turn nut clockwise to loosen and remove from mainshaft.

4. Remove mainshaft nut (21) and washer (22).
5. Remove the clutch assembly, primary chain and engine sprocket as a unit.
 - a. Inspect primary chain and sprockets for damage or excessive wear.
 - b. Inspect stator and rotor. See 7.7 ALTERNATOR.
 - c. Replace damaged parts as necessary.
6. Install adjusting screw assembly into pressure plate.
 - a. See Figure 6-18. Align two tabs on perimeter of release plate with corresponding recesses in pressure plate.
 - b. See Figure 6-17. Secure the adjusting screw assembly with large retaining ring (1).
7. Attach tools to compress clutch diaphragm spring. See Step 2 of CLUTCH PACK under 6.5 PRIMARY DRIVE/CLUTCH.
8. Remove clutch pack components. See Steps 3-4 of CLUTCH PACK under 6.5 PRIMARY DRIVE/CLUTCH.

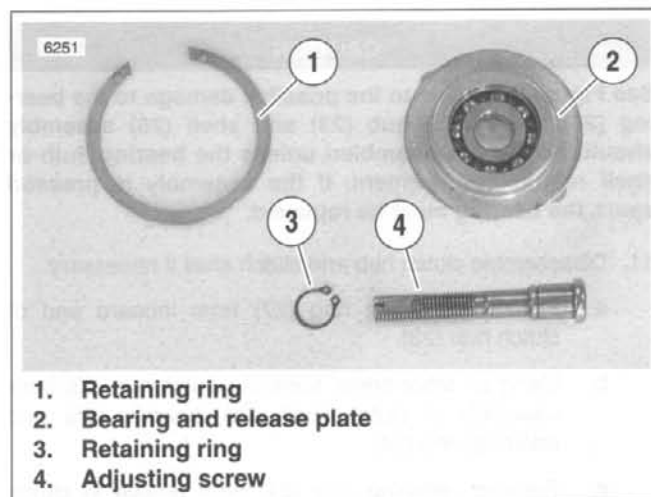


Figure 6-17. Adjusting Screw Assembly

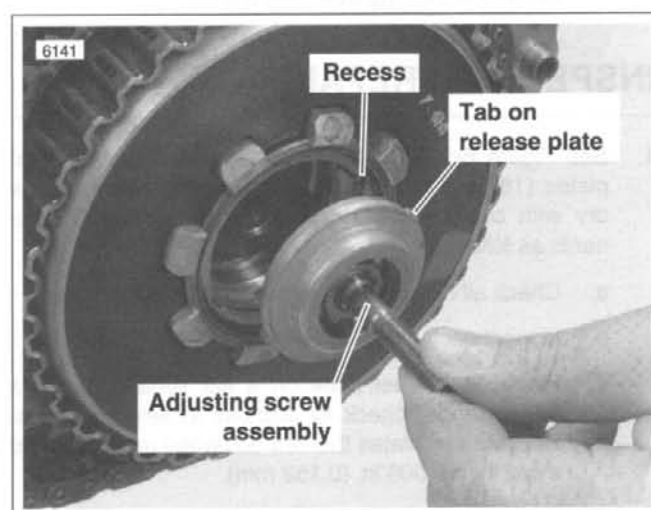


Figure 6-18. Aligning Tabs

9. See Figure 6-15. Disassemble pressure plate.
 - a. Place a wrench on the clutch spring forcing screw (1) flats to prevent the forcing screw from turning.
 - b. Turn the compressing tool handle (5) counterclockwise until the handle spins off.
 - c. Remove washer (4), bearing (3) and bridge (2).
 - d. Remove clutch spring forcing screw (1) from clutch adjusting screw.
 - e. Remove spring seat (9) and diaphragm spring (6) from pressure plate (7).
10. See Figure 6-17. Remove and disassemble adjusting screw assembly.
 - a. Remove large retaining ring (1).
 - b. Remove adjusting screw assembly (2, 3 and 4) from pressure plate.
 - c. If necessary, disassemble adjusting screw assembly. Remove and discard small retaining ring (3) and then separate the adjusting screw (4) from the bearing and release plate (2). Remove bearing from release plate.

CAUTION

See Figure 6-16. Due to the possible damage to the bearing (25), the clutch hub (23) and shell (26) assembly should not be disassembled unless the bearing, hub or shell require replacement. If the assembly is pressed apart, the bearing must be replaced.

11. Disassemble clutch hub and clutch shell if necessary.
 - a. Remove retaining ring (27) from inboard end of clutch hub (23).
 - b. Using an arbor press, separate clutch hub (23) from assembly of clutch shell (26), bearing (25) and retaining ring (24).
 - c. Remove retaining ring (24) from groove in clutch shell (26).
 - d. Press on the inboard side of bearing (25) outer race to remove bearing from clutch shell.

INSPECTION/REPAIR

1. See Figure 6-16. Wash all parts, except fiber (friction) plates (18) and bearing (25), in cleaning solvent. Blow dry with compressed air. Examine the clutch components as follows:
 - a. Check all clutch plates for wear and discoloration.
 - b. Inspect each steel (drive) plate (19) for grooves.
 - c. Place each steel plate on a flat surface. Using a feeler gauge, check for flatness in several places. Replace any plates that are damaged or are warped more than 0.006 in. (0.152 mm).
2. Check the diaphragm spring (11) for cracks or bent tabs. Install a **new** spring if either condition exists.
3. See Figure 6-19. Check fiber plates for thickness.
 - a. Wipe the lubricant from the eight fiber plates and stack them on top of each other.
 - b. Measure the thickness of the eight stacked fiber plates with a dial caliper or micrometer. The minimum thickness must be 0.661 in. (16.789 mm).
 - c. If the thickness is less than specified, discard the fiber plates and steel plates. Install a **new** set of both friction and steel plates.
4. See Figure 6-20. Check the clutch shell.
 - a. Inspect primary chain sprocket (1) and the starter ring gear (2) on the clutch shell. If either sprocket or ring gear are badly worn or damaged, replace the clutch shell.
 - b. Check the slots that mate with the clutch plates on both clutch shell (4) and hub (3). If slots are worn or damaged, replace shell and/or hub.
 - c. If clutch shell was removed from motorcycle, check the bearing for smoothness. Rotate the clutch shell while holding the clutch hub. If bearing is rough or binds, it must be replaced.

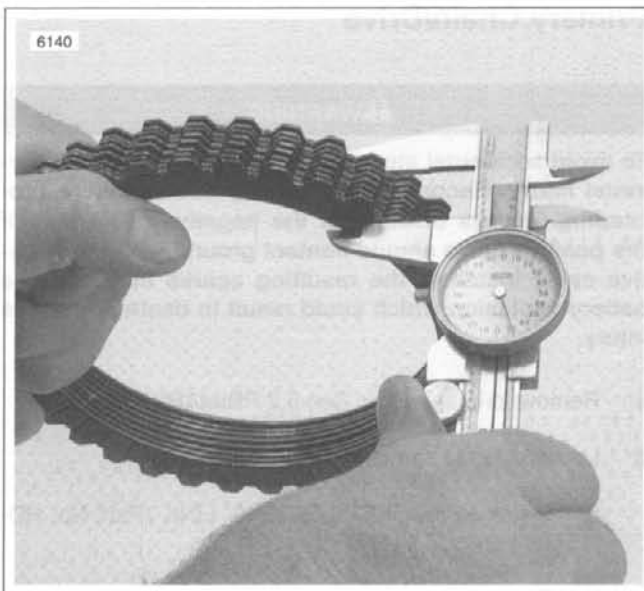


Figure 6-19. Measuring Friction Plates

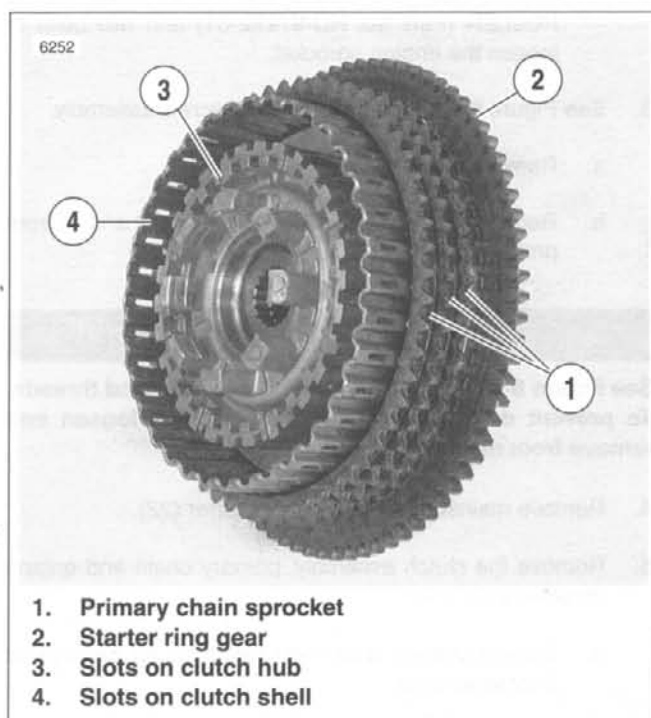


Figure 6-20. Checking Clutch Shell

ASSEMBLY

Clutch Pack

1. See Figure 6-16. Install the clutch pack, which consists of eight fiber plates (18), six steel plates (19) and a spring plate (20), into the clutch hub (23). The order of plate assembly, from inboard to outboard, is as follows:

F - St - F - St - F - St - F - **Sp** - F - St - F - St - F - St - F

(F = Fiber plate, St = Steel plate, **Sp** = Spring plate)

CAUTION

See Figure 6-15. Turn compressing tool handle (5) only the amount required to install spring seat (9) and snap ring (8). Excessive compression of diaphragm spring (6) could damage clutch pressure plate (7).

2. Place assembly of spring seat, **new** snap ring, diaphragm spring, pressure plate, adjusting screw components and compressing tool onto clutch hub and against clutch pack.
 - a. See Figure 6-21. Align square openings of pressure plate and diaphragm spring (1) so that the assembly can be installed over prongs (2) of clutch hub.
 - b. Position spring seat (5) with its larger O.D. side toward diaphragm spring (1).
 - c. See Figure 6-15. Place a wrench on the clutch spring forcing screw (1) flats to prevent the forcing screw from turning.
 - d. Turn compressing tool handle (5) clockwise until diaphragm spring (6) compresses just enough to install spring seat (9) and **new** snap ring (8) into the groove in clutch hub prongs.
 - e. With snap ring positioned against outboard side of spring seat, and fully seated in groove of clutch hub, carefully loosen and remove compression tool.

Primary Drive

1. See Figure 6-22. Assemble clutch hub and shell if necessary.
 - a. Press **new** bearing (3) in clutch shell (4). Secure bearing with a **new** retaining ring (2).
 - b. Press inboard end of clutch hub (1) into shell bearing (3). Secure with **new** retaining ring (5) on end of hub.
2. Assemble pressure plate hardware.
 - a. See Figure 6-17. Place bearing inside release plate. Insert adjusting screw (4) through bearing and release plate (2). Secure with **new** retaining ring (3).
 - b. See Figure 6-21. Position diaphragm spring (1) with its concave side facing toward pressure plate onto pressure plate assembly.

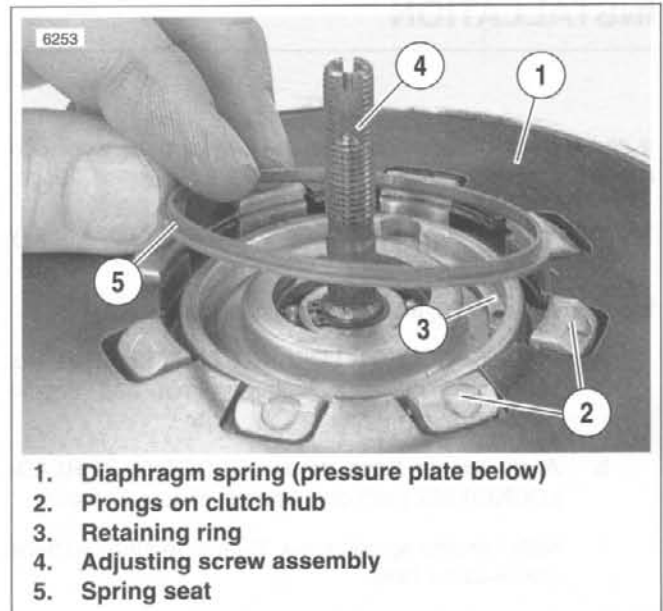


Figure 6-21. Spring Seat Installation

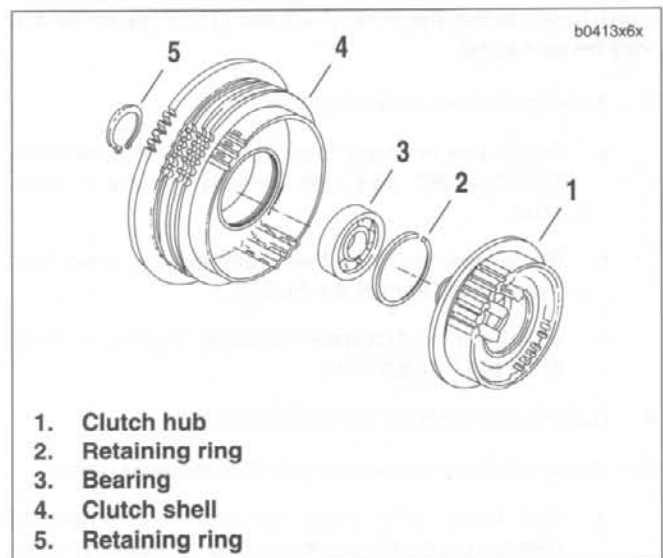


Figure 6-22. Clutch Hub and Shell Assembly

- c. Insert adjusting screw assembly (4) into pressure plate. Secure with large retaining ring (3).
 - d. Position spring seat (5) with its larger O.D. side toward diaphragm spring.
3. Attach tools to compress clutch diaphragm spring. See Step 2 of CLUTCH PACK under 6.5 PRIMARY DRIVE/CLUTCH. Do not tighten compressing tool against diaphragm spring at this time.
 4. Install the clutch pack. Follow all instructions of CLUTCH PACK under 6.5 PRIMARY DRIVE/CLUTCH.

INSTALLATION

NOTE

If clutch pack replacement was the only service work performed, start with Step 5.

1. Install the engine sprocket, clutch assembly and primary chain as a unit into primary chaincase.
2. See Figure 6-23. Install the engine sprocket nut.
 - a. Place SPROCKET LOCKING LINK (3) (Part No. HD-38362) between primary chain and engine sprocket.
 - b. Apply two or three drops of LOCTITE THREAD-LOCKER 262 (red) onto threads of sprocket shaft.
 - c. Install engine sprocket nut. Tighten to 190-210 ft-lbs (257.6-284.7 Nm).

CAUTION

See Figure 6-24. Washer (2) must be installed with the word "out" facing the mainshaft nut (1) or transmission may be damaged.

3. Install mainshaft nut and washer.
 - a. Apply two or three drops of LOCTITE THREAD-LOCKER 262 (red) onto threads on end of mainshaft.
 - b. Place washer (2) on mainshaft with the word "out" facing away from clutch hub (3).
 - c. Install nut (1) (**left-hand threads**). Tighten to 70-80 ft-lbs (94.9-108.5 Nm).
4. Remove SPROCKET LOCKING LINK.
5. Install adjusting screw assembly into pressure plate.
 - a. See Figure 6-18. Align two tabs on perimeter of release plate with corresponding recesses in pressure plate.
 - b. See Figure 6-17. Secure the adjusting screw assembly with retaining ring.
6. Install primary cover. See 6.2 PRIMARY CHAIN.

WARNING

Always connect positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion which could result in death or serious injury.

7. Connect battery cables, positive cable first.

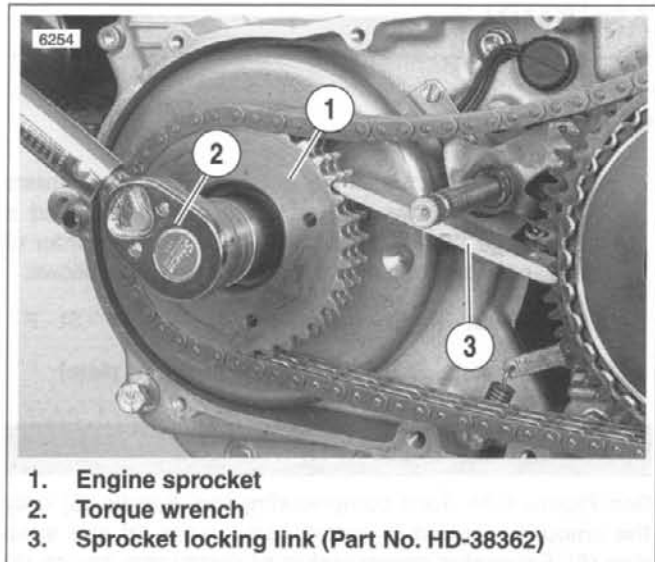


Figure 6-23. Sprocket Locking Link

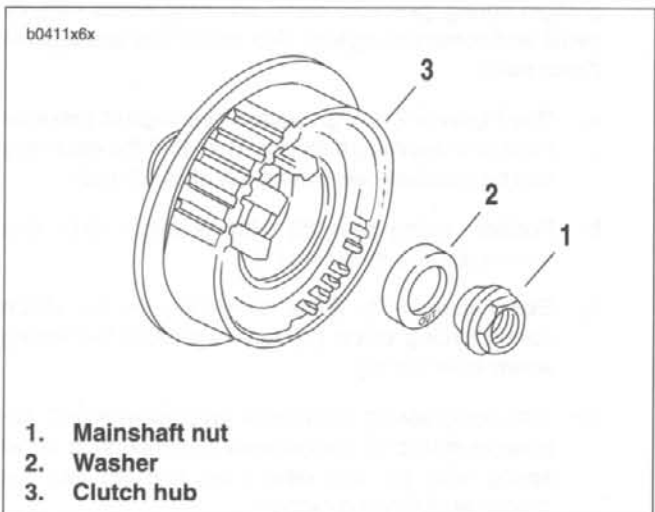


Figure 6-24. Mainshaft Nut and Washer

MODEL YEAR CHANGE

All 2000 Model Year Buell motorcycles have a taller second gear. Revised gear ratios are listed in 6.1 SPECIFICATIONS.

GENERAL

See Figure 6-25. The transmission is a five-speed constant-mesh type housed in an extension of the crankcase. The transmission permits the rider to vary the ratio of engine speed-to-rear driving wheel speed in order to meet the varying conditions of operation.

See Figure 6-26. The transmission is foot-operated by the gear shift lever, which transmits the force through a gear shifter shaft. The shifter shaft actuates a pawl and a shifter fork drum. The shifter fork drum moves shifter forks, which slide a series of shifter clutch gears, on the mainshaft and countershaft, into and out of mesh with the other gears.

LUBRICATION

Drain transmission and refill to correct level with fresh, clean lubricant at least once each year or every 5000 miles (8000 km), whichever comes first. For best results, drain lubricant while hot.

See 1.12 CLUTCH for more information.

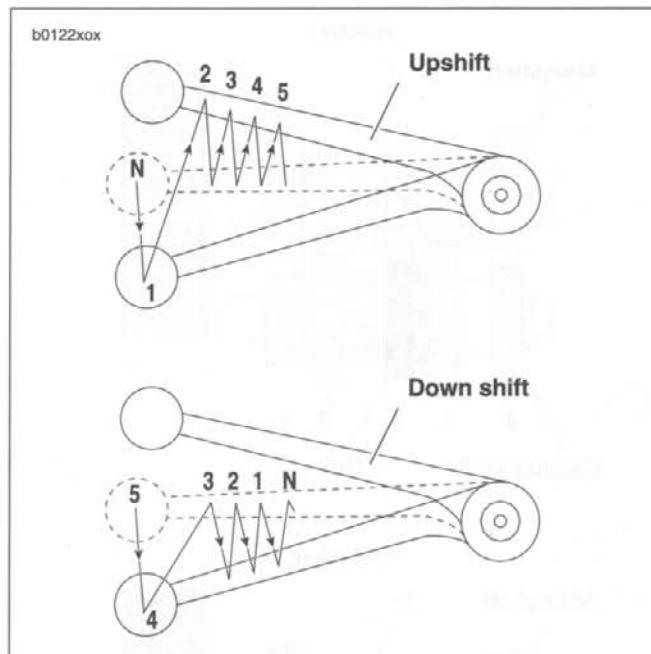


Figure 6-25. Transmission Pattern

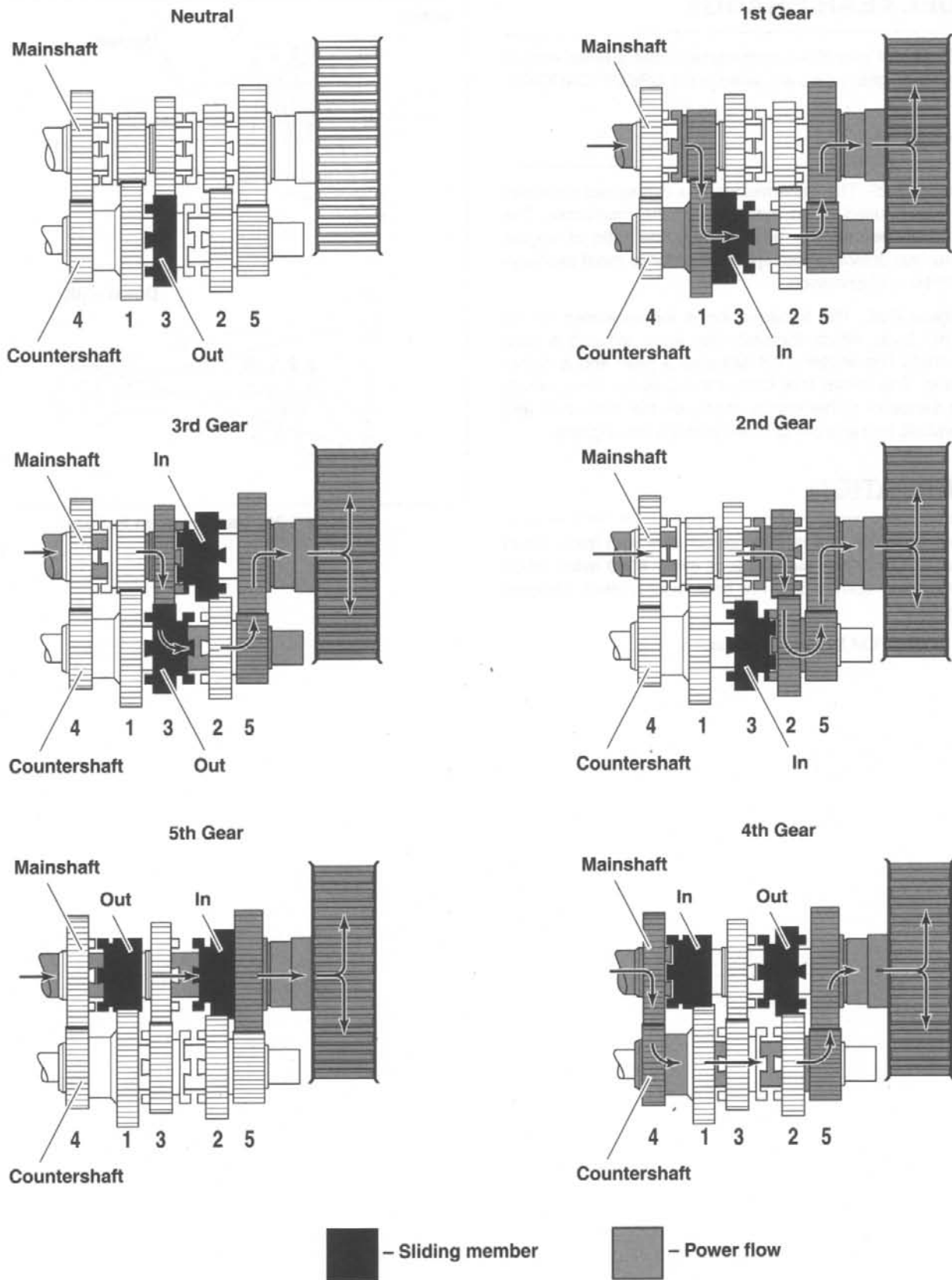


Figure 6-26. Transmission Power Flow

GENERAL

The rear compartment of the left and right crankcase halves form the transmission case. An access cover (door) allows removal of transmission components without removing the engine or disassembling (splitting) the crankcase.

REMOVAL

1. Raise rear wheel off floor using REAR WHEEL SUPPORT STAND (Part No. B-41174).
2. Remove muffler and drain primary drive/transmission. See TRANSMISSION FLUID.
3. Remove sprocket cover. See 2.38 SPROCKET COVER.
4. Remove rear fender. See 2.40 REAR FENDER.
5. See Figure 6-27. Move rear wheel forward.
 - a. Loosen rear axle nut (2) (metric).
 - b. Hold axle adjuster bolt (1) with a 5/16 in. wrench. Loosen locknut (3).
 - c. Turn adjusters (4) on each side of swingarm an equal number of turns counterclockwise.
 - d. Move rear wheel as far forward as possible.
6. See Figure 6-28. Place transmission in first gear. Remove two socket head screws (5) and lockplate (4).

CAUTION

Transmission sprocket nut has left-hand threads. To prevent damage, turn nut clockwise to loosen and remove from main drive gear shaft.

7. Remove transmission sprocket nut (3) from main drive gear shaft (1).
8. Remove secondary drive belt from transmission sprocket (2). Remove transmission sprocket from main drive gear shaft (1).
9. Remove primary cover. See 6.2 PRIMARY CHAIN.
10. Remove clutch assembly, primary chain and engine sprocket. See PRIMARY CHAIN/DRIVE under 6.5 PRIMARY DRIVE/CLUTCH.

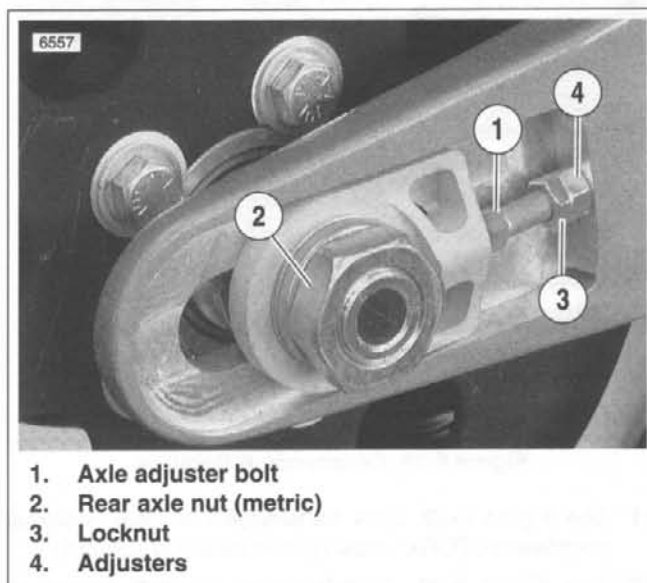


Figure 6-27. Rear Axle Assembly

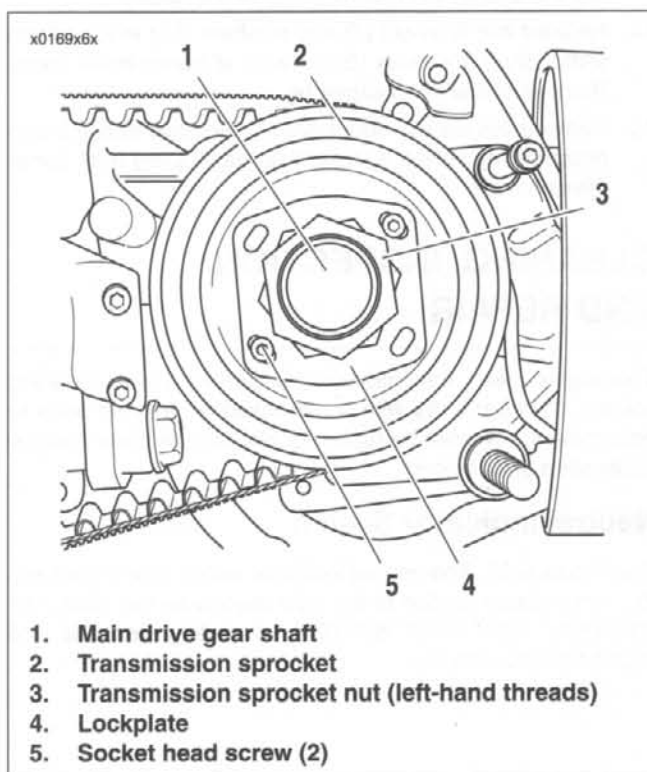


Figure 6-28. Transmission Sprocket

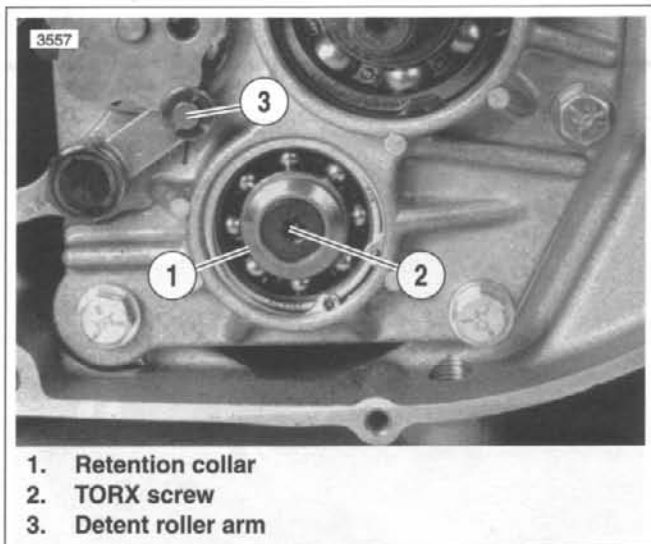


Figure 6-29. Countershaft Retainer

11. See Figure 6-29. Lock transmission in gear. Remove countershaft TORX screw (2) and retention collar (1).
12. See Figure 6-30. Detach spring (1) from groove in post (2).
13. Remove retaining ring (9) and detent plate (8). You will need to use a **new** retaining ring for installation.
14. Remove two locknuts (3) and washers (10) which attach shifter shaft assembly (6) to studs at transmission case. Remove shifter shaft assembly.
15. Remove five access door bolts (7). Remove transmission assembly by pulling it straight outward, away from transmission case.

CLEANING, INSPECTION AND REPAIR

Thoroughly clean transmission compartment with cleaning solvent. Blow parts dry with compressed air. Inspect parts to determine if any must be replaced. Replace all parts that are badly worn or damaged.

Neutral Indicator Switch

See Figure 6-31. The neutral indicator switch is threaded into the transmission portion of the right crankcase half. See 7.23 NEUTRAL INDICATOR SWITCH for testing, removal and installation procedures.

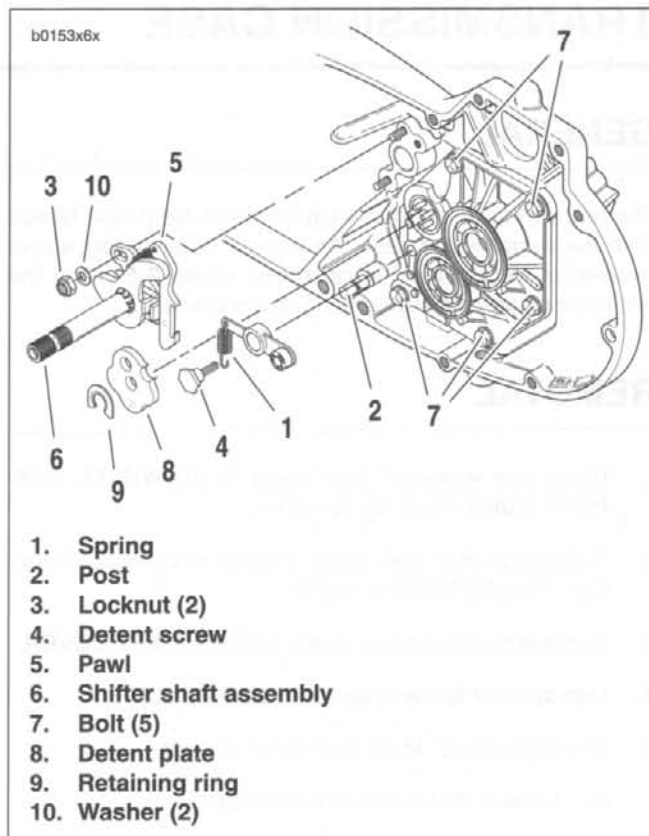


Figure 6-30. Shifter Shaft Assembly

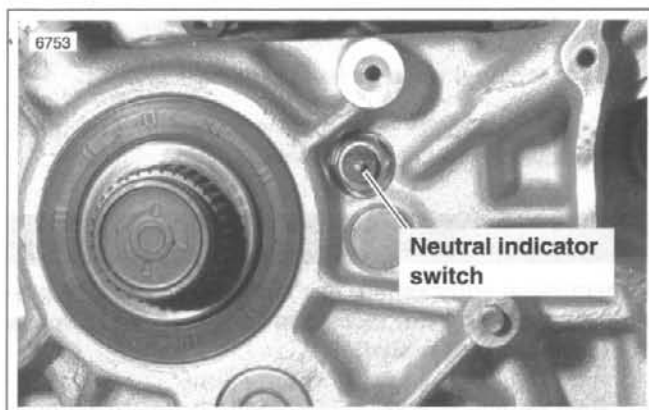


Figure 6-31. Neutral Indicator Switch

SHIFTER FORKS AND DRUM

6.8

DISASSEMBLY

1. Remove transmission assembly. See 6.7 TRANSMISSION CASE. Mount transmission assembly in vise with protected jaws.
2. See Figure 6-32. Remove nut (10), washer (14), detent screw (18), plates (8, 9), detent arm (16) and spring (17).
3. Remove and discard the three fork cotter pins (4).
4. Remove three shifter fork pins (5). A small magnet is useful in freeing the fork pins (5).

5. Slide shifter fork drum (7) away from access door, through shifter forks. The neutral indicator pin prevents removal in the other direction.

6. Remove shifter forks (1, 2 and 3).

CLEANING, INSPECTION AND REPAIR

1. See Figure 6-32. Clean all parts except bearings (19, 20) with solvent.

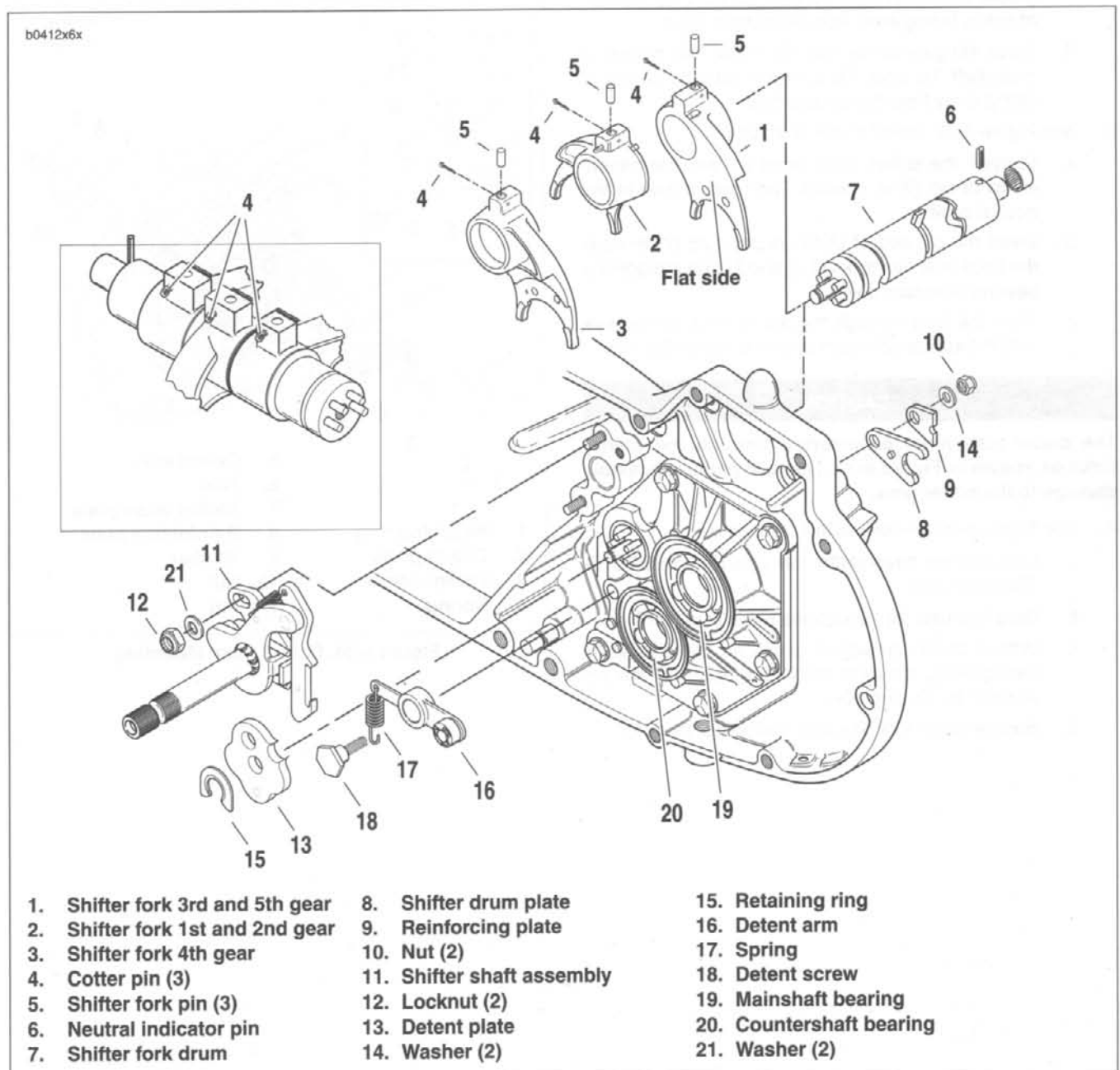


Figure 6-32. Shifter Mechanism

2. Inspect bearings (19, 20) and shifter drum ends. If ends of shifter drum are pitted or grooved, replace the shifter drum and bearings. If replacing bearings, see 6.11 ACCESS DOOR BEARINGS.
3. Inspect shifter fork drum (7) for cracks or wear. Replace if necessary.

ASSEMBLY

1. See Figure 6-33. Identify all shifter forks before assembly. Note shape of fork and location of fork pin holes.
2. Install shifter forks.
 - a. Lubricate the shaft bore of all three shifter forks (1, 2 and 3) with SPORT-TRANS FLUID.
 - b. Place 3rd and 5th gear shifter fork (1) in the fork groove of mainshaft 2nd gear. Be sure the flat side of fork is facing the access cover.
 - c. Place 1st and 2nd gear shifter fork (2) in the fork groove of countershaft 3rd gear. Be sure the flat side of fork is facing away from the access door.
 - d. Place 4th gear shifter fork (3) in the fork groove of mainshaft 1st gear. Be sure the flat side of fork is facing away from the access door.
3. See Figure 6-32. Install shifter shaft drum.
 - a. Position the shifter drum shaft so that the neutral indicator pin (6) is upward. The shaft is then in the neutral position.
 - b. Insert the pin end of shifter drum shaft (7) through the hubs of shifter forks (1, 2 and 3) and through the bearing in access cover.
 - c. Align the hole through the top of each shifter fork with the appropriate cam groove in the shifter drum.

CAUTION

The cotter pins must be inserted through the shifter forks as shown in Figure 6-33. This will prevent possible damage to the cotter pins.

4. See Figure 6-32. Secure shifter mechanism.
 - a. Lubricate the three shifter fork pins (5) with SPORT-TRANS FLUID.
 - b. Drop fork pins (5) through the holes in shifter forks.
 - c. With a small screwdriver press on the pins while manipulating the forks back and forth until the pin seats in the drum groove.
 - d. Secure shifter fork pins with new cotter pins (4).

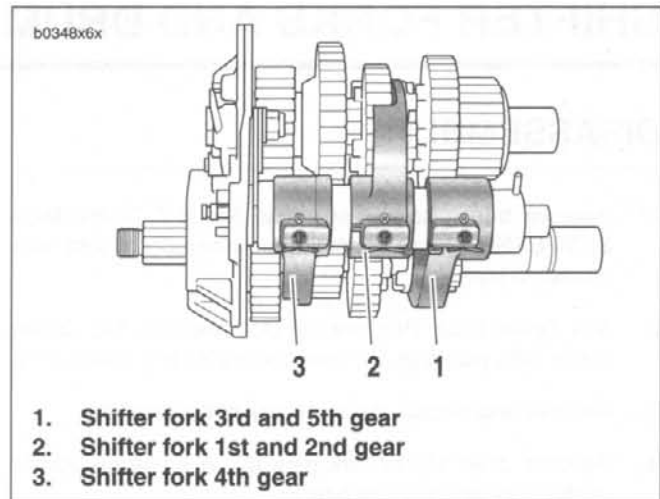


Figure 6-33. Shifter Fork Identification

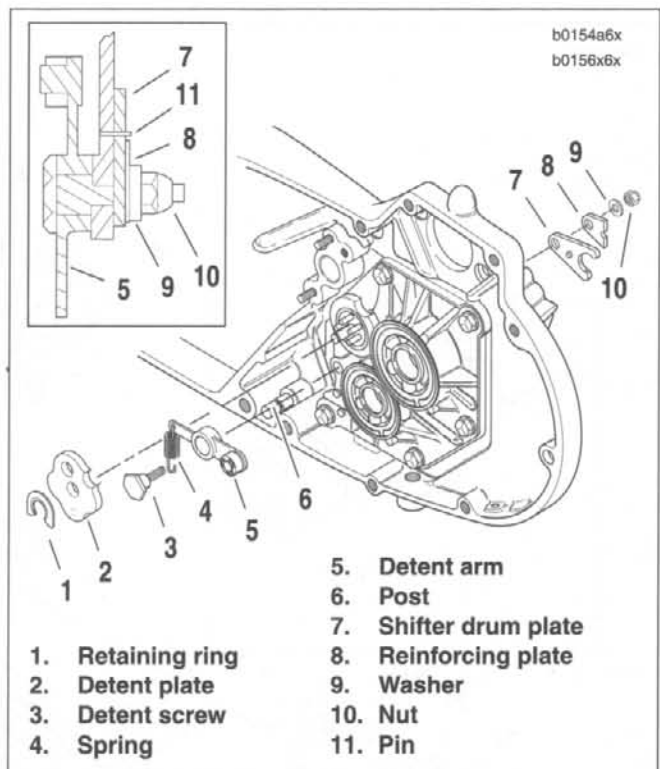


Figure 6-34. Detent Plate Mounting

NOTE

See Figure 6-34. Detent plate (2) and retaining ring (1) are not installed at this time. These parts are installed during transmission installation after the final shifter pawl adjustment is made. See 6.13 TRANSMISSION INSTALLATION AND SHIFTER PAWL ADJUSTMENT.

5. Install detent plate hardware.
 - a. At the inside of the access door, place the shifter drum plate (7) in the groove of the drum shaft. See inset Figure 6-34.
 - b. Correctly align reinforcement plate (8) with the pin pressed in the shifter drum plate (7).
 - c. Insert detent screw (3) through detent arm (5), access door, shifter drum plate (7), reinforcing plate (8) and washer (9).
 - d. Thread nut (10) on detent screw. Tighten to 13-17 ft-lbs (17.6-23.0 Nm).

NOTE

See Figure 6-35. Install detent roller arm (2) between countershaft bearing (1) and detent plate (3) location.

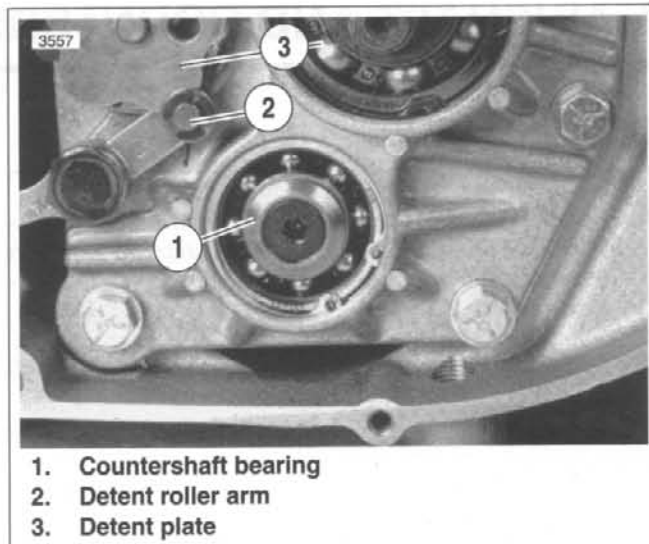


Figure 6-35. Detent Roller Arm

DISASSEMBLY

1. Remove transmission assembly. See 6.7 TRANSMISSION CASE. See Figure 6-36. Clamp transmission assembly in a vise, with protective jaws, to work on disassembly.
2. Remove shifter forks and drum as described under 6.8 SHIFTER FORKS AND DRUM.

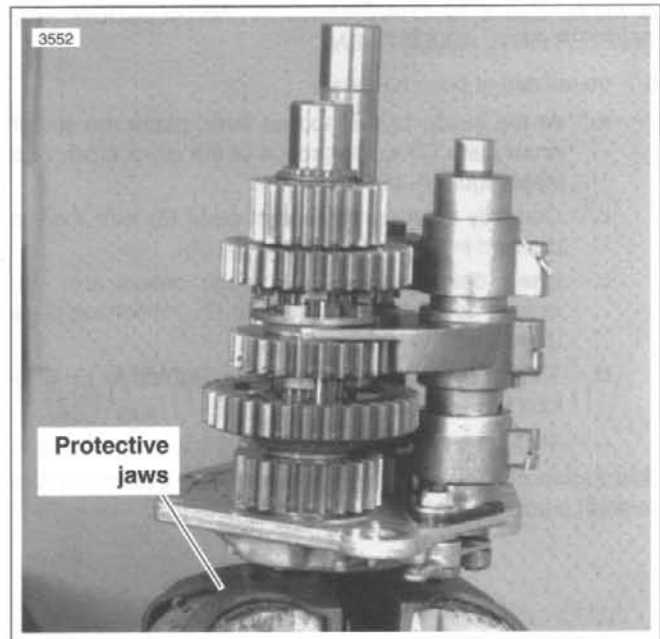


Figure 6-36.

NOTE

As the transmission runs, each part develops a certain wear pattern and a kind of "set" with its mating parts. For this reason, it is important that each component be reinstalled in its original location and facing its original direction.

3. See Figure 6-37. As each component is removed, place it on a clean surface in the exact order of removal.

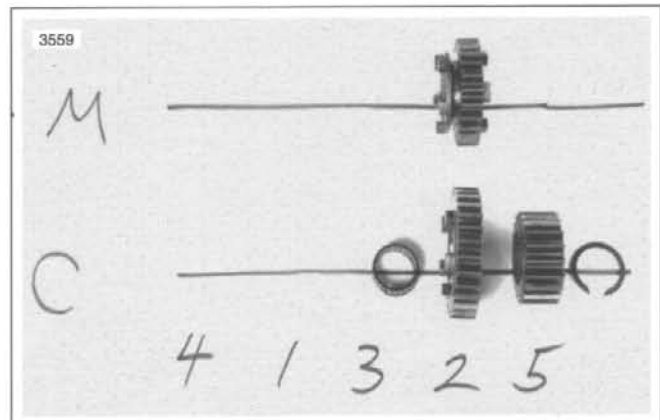


Figure 6-37.

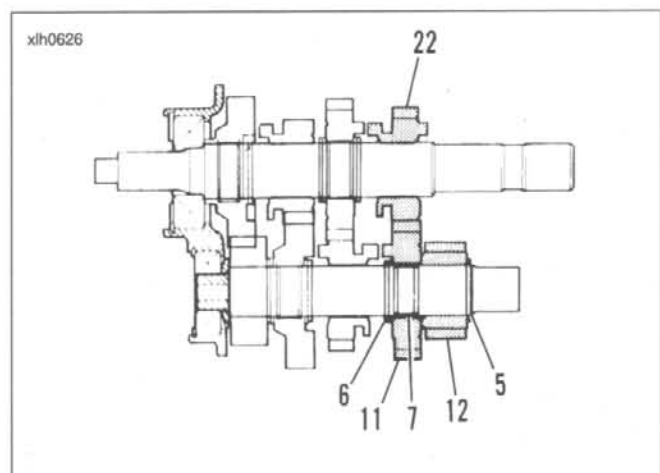


Figure 6-38.

See Figure 6-38. Using RETAINING RING PLIERS (Part No. J-5586) remove and discard retaining ring (5) next to countershaft 5th gear (12). Slide countershaft 5th (12), mainshaft 2nd (22) and countershaft 2nd (11) off end of shafts.

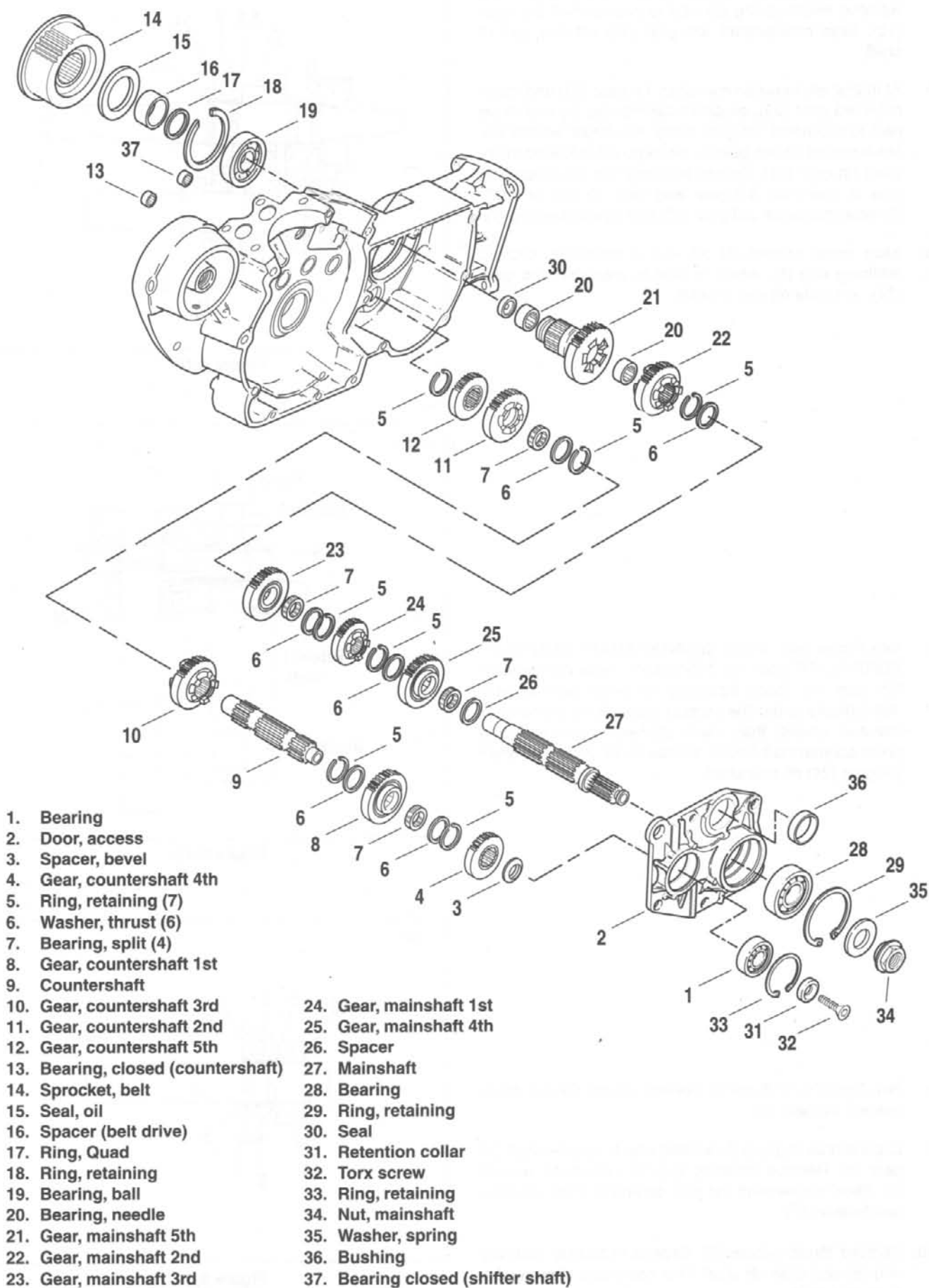


Figure 6-39. Transmission Assembly

4. Remove split bearing (7) that was under gear (11) and thrust washer (6) on the countershaft. See Figure 6-40. Remove retaining ring (5) next to countershaft 3rd gear (10). Slide countershaft 3rd gear (10) off free end of shaft.
5. At mainshaft, between mainshaft 1st gear (24) and mainshaft 3rd gear (23), expand retaining ring (5) and move next to mainshaft 1st gear along with thrust washer (6). Move mainshaft 3rd gear as far as possible toward mainshaft 1st gear (24). Expand retaining ring (5) at opposite side of mainshaft 3rd gear and slide off end of shaft. Remove mainshaft 3rd gear (23) and its split bearing (7).
6. Slide thrust washer (6) off end of mainshaft. Expand retaining ring (5), which is next to mainshaft 1st gear (24), and slide off end of shaft.

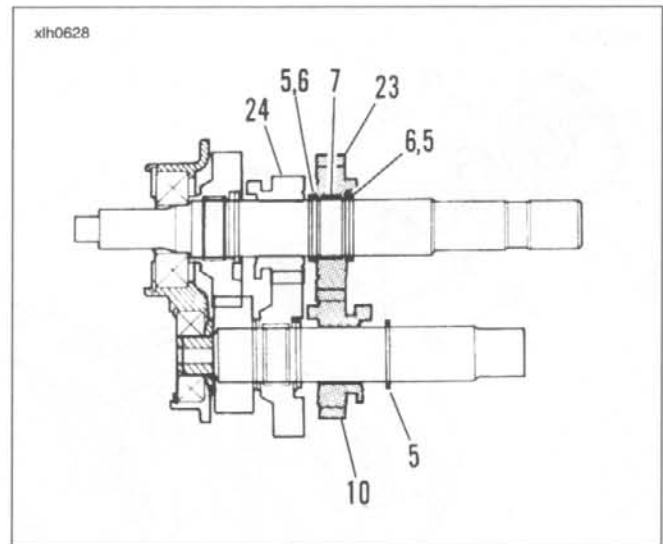


Figure 6-40.

7. See Figure 6-41. Place COUNTERSHAFT GEAR SUPPORT PLATE (Part No. HD-37404) under countershaft 4th gear (4). Place assembly on press with suitable metal blocks under the support plate. Place a socket or mandrel, smaller than inside diameter of bearing, and press countershaft free of access cover. Slide mainshaft 1st gear (24) off mainshaft.

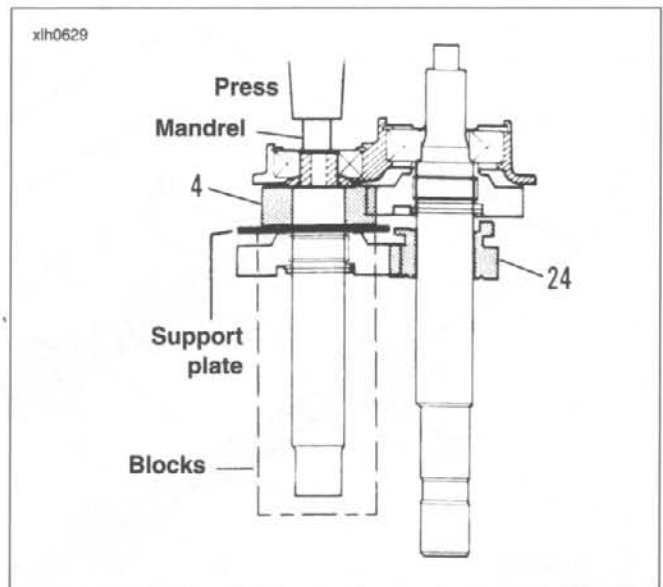


Figure 6-41.

8. See Figure 6-42. Remove beveled spacer (3) and countershaft 4th gear (4).
9. Expand retaining ring (5) located next to countershaft 1st gear (8). Remove retaining ring (5) and thrust washer (6). Slide countershaft 1st gear off end of shaft. Remove split bearing (7).
10. Remove thrust washer (6). Expand remaining retaining ring (5) and slide off shaft. This completes disassembly of countershaft.

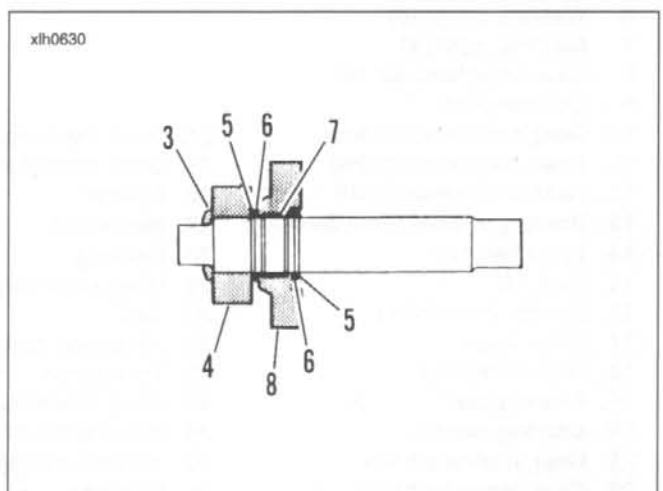


Figure 6-42.

11. See Figure 6-43. Place mainshaft and access door assembly on arbor press with support under mainshaft 4th gear (25). Press on end of shaft until mainshaft is free of access door bearing. Remove spacer (26), mainshaft 4th gear (25) and split bearing (7).
12. Remove thrust washer (6). Expand and remove remaining retaining ring (5).

CLEANING, INSPECTION AND REPAIR

1. Clean all parts (except bearings) in cleaning solvent and blow dry with compressed air.
2. Check gear teeth for damage. If gears are pitted, scored, rounded, cracked or chipped, they should be replaced.
3. Inspect the engaging dogs on the gears. Replace the gears if dogs are rounded, cracked, battered, chipped or dimpled.
4. Discard all retaining rings that were removed.

ASSEMBLY

CAUTION

During assembly, the split bearings (7) and the internal bores of the gears must be lubricated with **SPORT-TRANS FLUID** prior to assembly. Leaving these parts dry could accelerate wear at start-up and may result in vehicle damage.

1. Find a section of pipe that matches the inner race of mainshaft bearing (28). See Figure 6-44. Place the door assembly, outside downward, on a press with the inner race of bearing (28) resting on the section of pipe. Insert the splined end of the shaft through the bearing and hold in a vertical position. Press the shaft into the bearing until the bearing bottoms against the shaft shoulder.

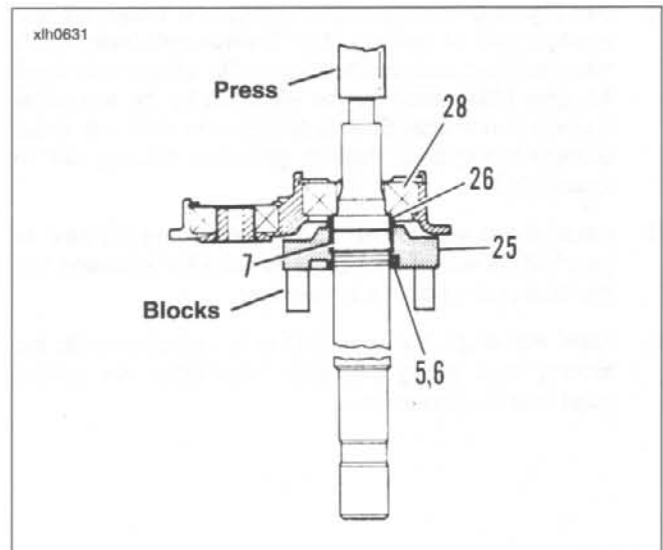


Figure 6-43.

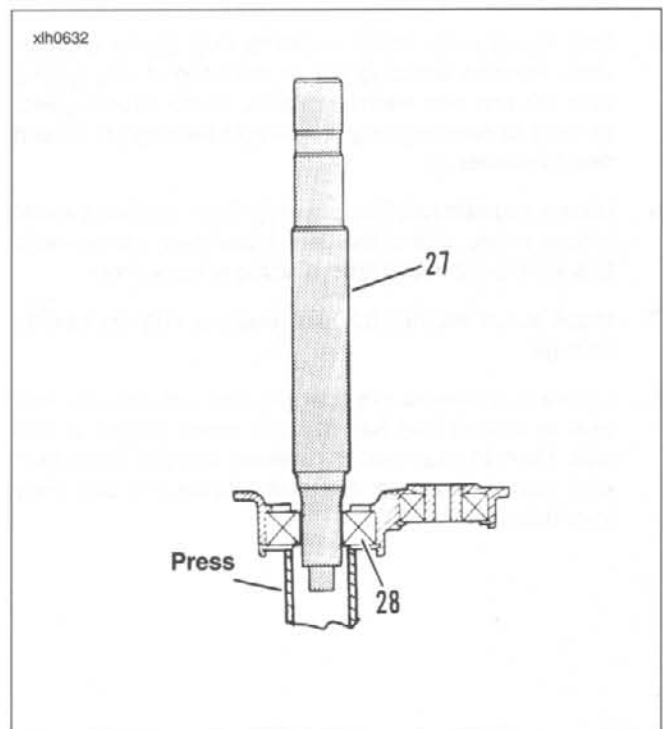


Figure 6-44.

2. See Figure 6-45. Place spacer (26) over mainshaft and position next to bearing (28). Position split bearing (7) into machined seat next to spacer (26). Locate mainshaft 4th gear (25), which can be identified by the two radial grooves at one side. Slide gear (25) onto shaft with radial grooves facing door. Position gear over bearing next to spacer (26).
3. Install thrust washer (6) and retaining ring (5) next to gear (25). It will be necessary to push the retaining ring into final position with a screwdriver.
4. Slide mainshaft 1st gear (24) onto mainshaft with the locking dogs facing gear (25). The shifter fork groove must face the access door.

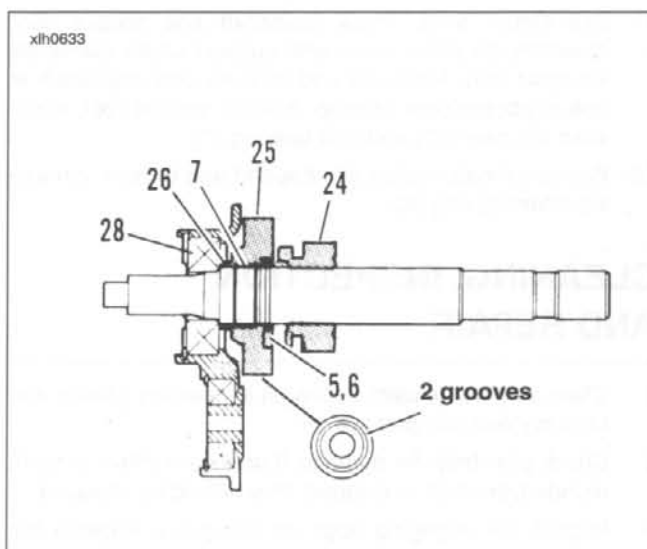


Figure 6-45.

5. See Figure 6-46. Install retaining ring (5) on countershaft. Position retaining ring in the second ring groove from the end with internal threads. Install thrust washer (6) next to retaining ring. Install split bearing (7) in seat next to washer (6).
6. Locate countershaft first gear (8). Gear (8) has a radial groove at one side of the gear. Install gear (8) over split bearing (7) with radial groove facing access door.
7. Install thrust washer (6) and retaining ring (5) next to gear (8).
8. Locate countershaft 4th gear (4). This flat, shoulderless gear is splined and has a single radial groove at one side. Position gear next to retaining ring (5). Place beveled washer (3) over end of shaft with beveled side away from gear (4).

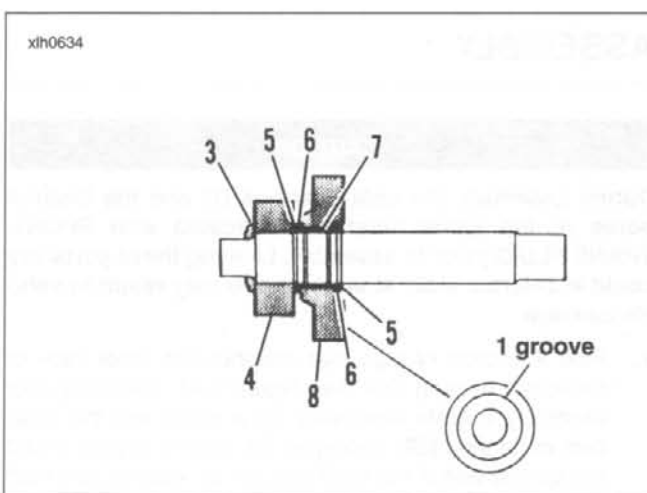


Figure 6-46.

9. See Figure 6-47. Stand countershaft assembly on press with beveled washer upward. Place access cover and mainshaft assembly on top of countershaft with bearing (1) in access cover over end of countershaft. Place a socket or section of pipe on inner race of bearing (1). Hold assembly straight, making sure gear teeth on countershaft are engaged with gear teeth on mainshaft, and press bearing onto shaft until beveled spacer bottoms against bearing.

NOTE

When correctly installed, countershaft 4th gear should have zero end play.

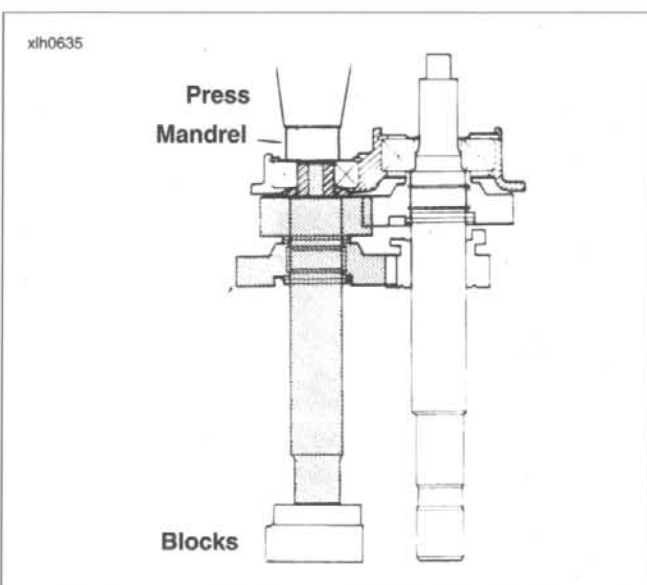


Figure 6-47.

10. See Figure 6-48. At mainshaft, install retaining ring (5) and thrust washer (6). Install split bearing (7) in seat next to thrust washer (6).
11. Install mainshaft 3rd gear (23) onto shaft over bearing (7).
12. Install thrust washer (6) and retaining ring (5) next to gear (23).
13. Install countershaft 3rd gear (10) onto shaft. The shifter fork groove must face away from the access door.

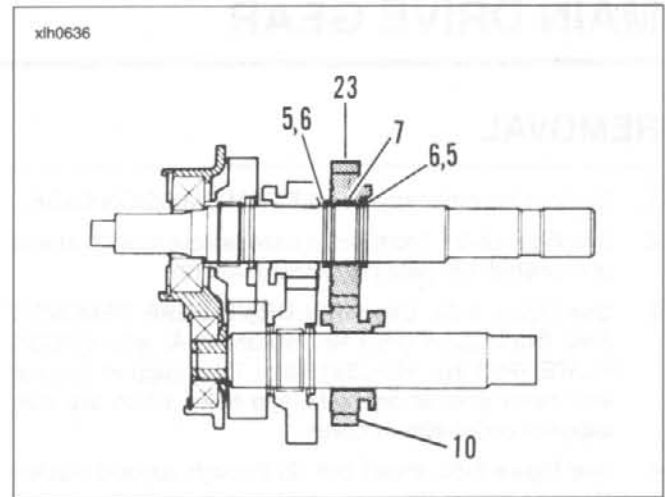


Figure 6-48.

14. See Figure 6-49. Install retaining ring (5) and thrust washer (6) on countershaft. Install split bearing (7) into seat next to thrust washer (6).
15. Install countershaft 2nd gear (11) over bearing (7).
16. Install mainshaft 2nd gear (22) onto shaft. The shifter fork groove must face the access door.
17. Install shouldered countershaft 5th gear (12). The single radial groove must face away from the access door.
18. Expand retaining ring (5) and slide into groove next to countershaft 5th gear (12).

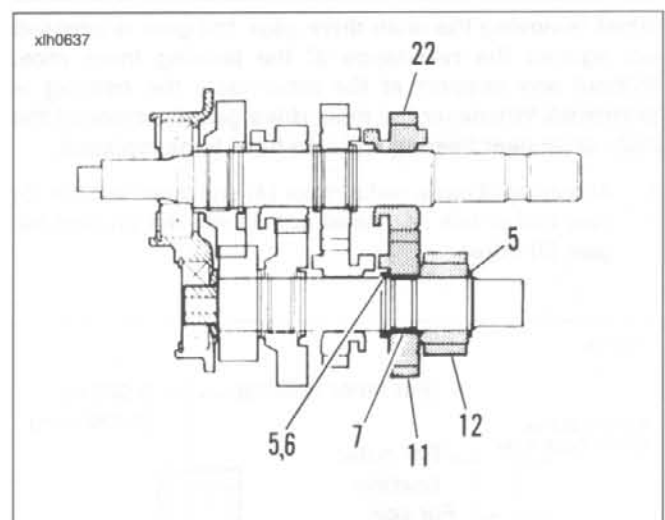


Figure 6-49.

19. See Figure 6-50. At outside of access door, position retention collar (31) next to end of countershaft with beveled side facing outward. Apply a few drops of LOCTITE THREADLOCKER 243 (blue) to the threads of TORX screw (32). Insert TORX screw (32) through retention collar and thread into end of shaft. Place transmission in gear and tighten TORX screw to 13-17 ft-lbs (17.6-23.0 Nm).

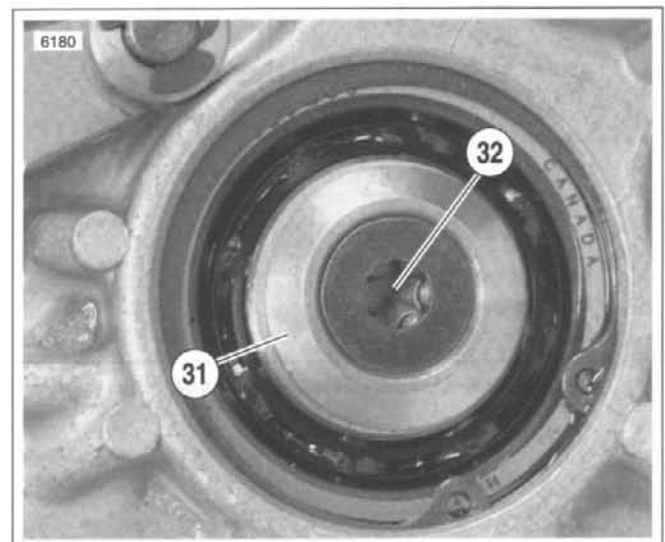


Figure 6-50.

20. Install shifter forks and drum. See 6.8 SHIFTER FORKS AND DRUM.

REMOVAL

1. Remove transmission. See 6.7 TRANSMISSION CASE.
2. See Figure 6-51. From inside case tap out seal (3) at end of mainshaft 5th gear (1). Discard seal (3).
3. See Figure 6-52. Use MAIN DRIVE GEAR REMOVER AND INSTALLER (Part No. HD-35316-A) with CROSS PLATE (Part No. HD-35316-91). Take support bracket and insert pins, at one side, into holes which are now exposed under access cover.
4. See Figure 6-53. Insert bolt (2) through support bracket (1) and 5th gear (3).

CAUTION

When removing the main drive gear, the gear is pressed out against the resistance of the bearing inner race. Without any support at the inner race, the bearing is destroyed. Whenever the main drive gear is removed the main drive gear bearing will also have to be replaced.

5. At outside of case, place driver (4) and thrust washer (5) over end of bolt (2). Install and tighten nut (6) until 5th gear (3) is free.

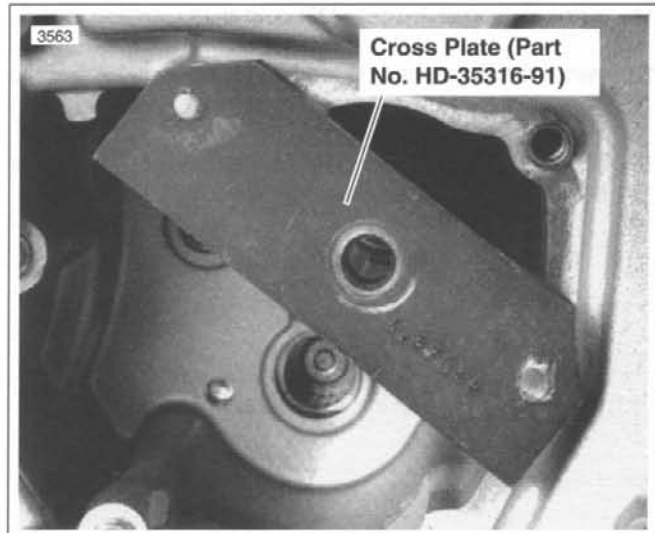


Figure 6-52. Support Bracket Mounting

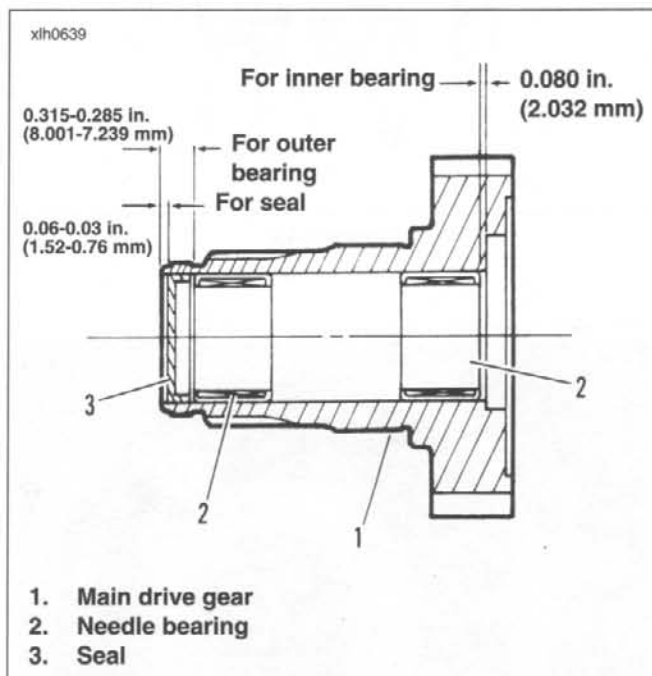


Figure 6-51. Main Drive Gear Assembly

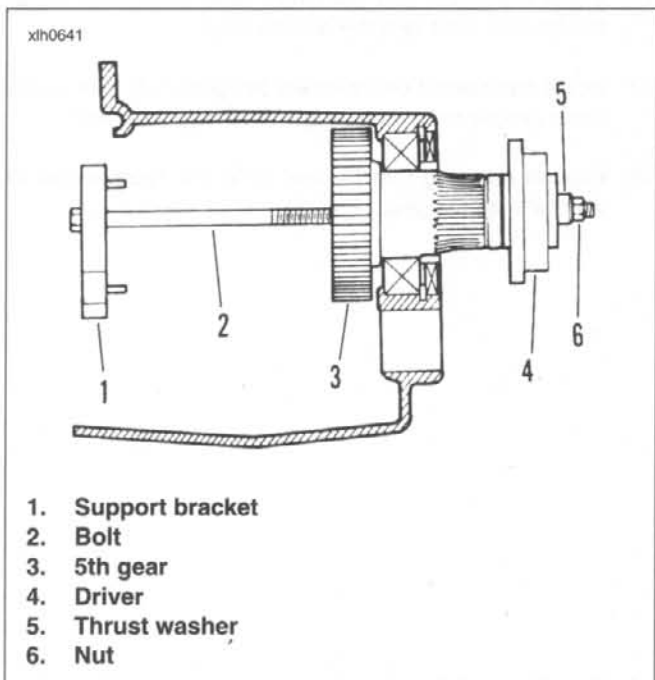


Figure 6-53. Removing Main Drive Gear

DISASSEMBLY

Drive out needle bearings from inside bore of main drive gear. Do not reuse bearings after removal.

ASSEMBLY

1. See Figure 6-54. Use INNER/OUTER MAIN DRIVE GEAR NEEDLE BEARING INSTALLATION TOOL (Part No. HD-37842A) for assembly. Select which end of tool to use.
 - a. The end stamped 0.080 in. (2.032 mm) is for driving the bearing into the inner end.
 - b. The end stamped 0.315 in. (8.001 mm) is for the outer end bearing.
2. Assemble parts. The installation tool will automatically bottom on the gear when the correct depth is reached.
 - a. Place main drive gear on a press.
 - b. Press in the outer bearing to a depth of 0.315-0.285 in. (8.001-7.239 mm).
 - c. Press in the inner bearing to a depth of 0.080 in. (2.032 mm).

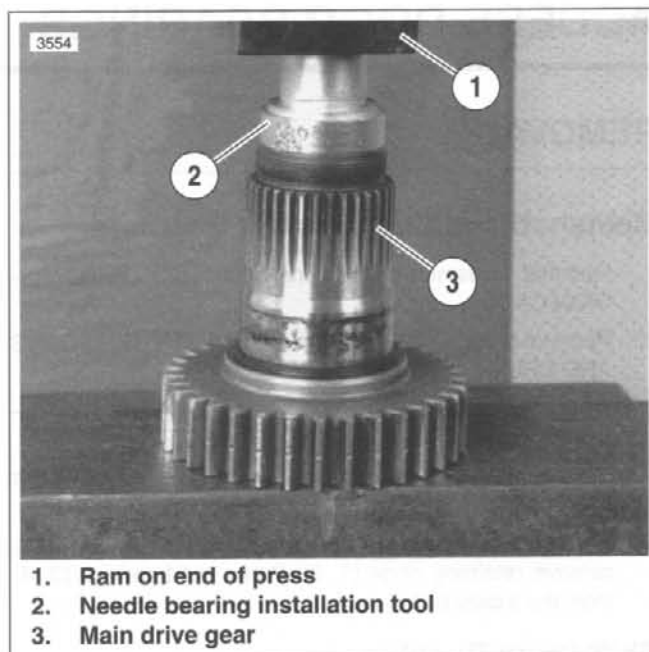


Figure 6-54. Needle Bearing Installation Tool

INSTALLATION

1. Replace main drive gear bearing. See 6.10 MAIN DRIVE GEAR.
2. See Figure 6-55. Use MAIN DRIVE GEAR REMOVER AND INSTALLER TOOL for assembly.
 - a. Take bolt (2) and place washer (5) followed by main drive gear (4) over end of bolt.
 - b. From inside of case insert bolt and main drive gear through inner race of ball bearing.
 - c. Insert threaded end of bolt (2) through installer cup (3) and thrust washer (1).
 - d. Thread nut (6) onto end of bolt (2). Tighten nut (6) until shoulder on gear (4) bottoms against inner race of bearing.
3. See Figure 6-51. Tap in new seal (3) at threaded end of 5th gear.

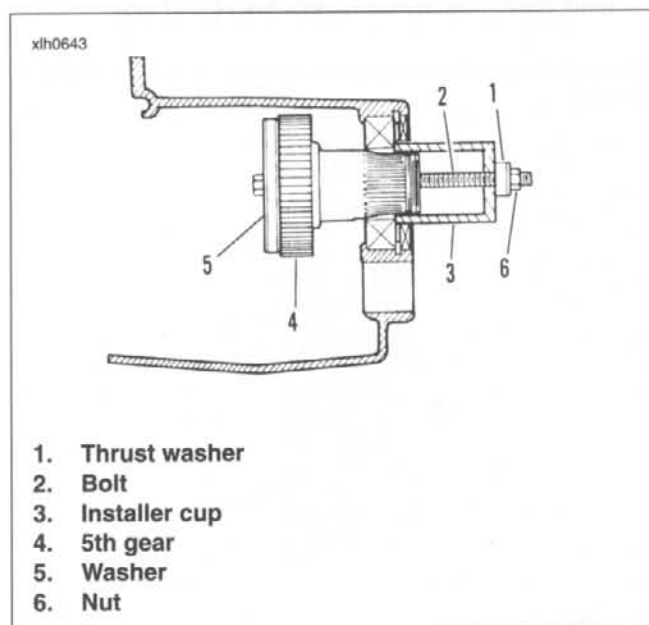


Figure 6-55. Main Drive Gear Installation

REMOVAL

Mainshaft and Countershaft Bearings

1. Remove transmission assembly. See 6.7 TRANSMISSION CASE.
2. Remove shifter forks and drum. See 6.8 SHIFTER FORKS AND DRUM.
3. Remove countershaft and mainshaft. See 6.9 MAINSHAFT AND COUNTERSHAFT.
4. Inspect the mainshaft and countershaft ball bearings for pitting, scoring, discoloration or other damage.
5. See Figure 6-56. If bearing replacement is required, remove retaining rings (1, 2). Press out bearings (3, 4) from the inside of the door.

Shift Drum Bushing

1. Inspect the shifter drum bushing for pitting, scoring, discoloration or excessive wear. If bushing requires replacement press bushing out of door from either side.

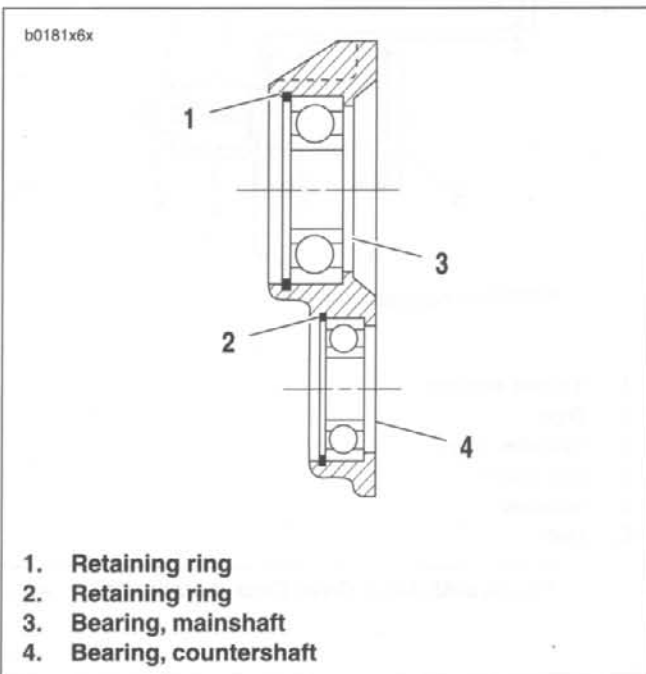


Figure 6-56. Ball Bearing Assembly

INSTALLATION

Mainshaft and Countershaft Bearings

1. Lay access door on press with inside surface of door downward.
2. Lay bearing squarely over bore with printed side of bearing upward. Place section of pipe or tubing (slightly smaller than outside diameter of bearing) against outer race. Press bearing into bore until bearing bottoms against shoulder.
3. Install **new** retaining ring with beveled side facing away from bearing.

Shift Drum Bushing

1. Lay access door on press with outside surface of door downward.
2. See Figure 6-57. Lay bushing squarely over bore. Locate socket or pipe that is slightly larger than diameter of bushing. Place socket or pipe on bushing and press into bore until bushing is flush with or 0.020 in. (0.508 mm) below inside surface. If using a pressing tool larger than diameter of bushing, the pressing tool will bottom against door when bushing is flush with top surface.

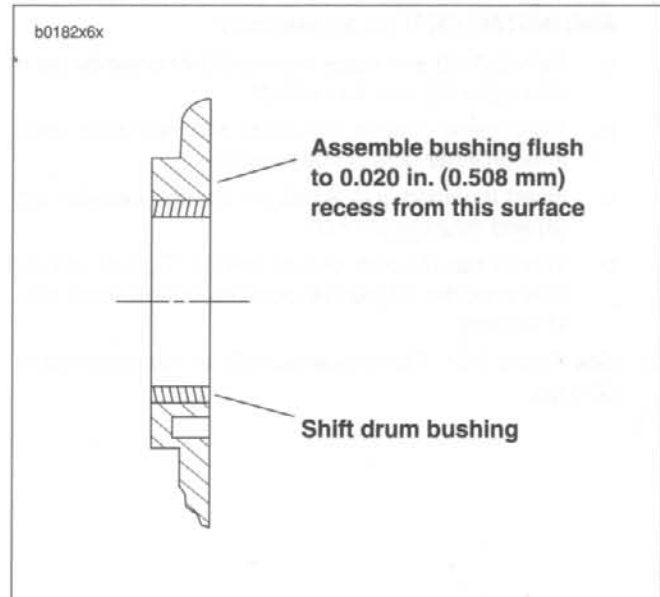


Figure 6-57. Shift Drum Bushing Assembly

REMOVAL

1. Remove transmission assembly. See 6.7 TRANSMISSION CASE. Remove main drive 5th gear. See 6.10 MAIN DRIVE GEAR.
2. At outside of case remove seal next to 5th gear bearing retainer. Remove retaining ring.
3. From inside transmission case drive bearings (5th gear, countershaft or shifter shaft) out of bores. Carefully tap bearings free by working around bearing diameter to keep bearing from skewing.

INSTALLATION

Mainshaft 5th Gear Ball Bearing

1. Locate MAIN DRIVE GEAR REMOVER AND INSTALLER (Part No. HD-35316-A). See Figure 6-58. Place support bracket pins in appropriate holes in transmission case.
2. See Figure 6-59. Insert bolt (2) through support bracket (1), **new** bearing (3), driver (4) and thrust bearing (5). Thread nut (6) on end of bolt. Tighten nut carefully until bearing is started in bore squarely. Tighten nut (6) until bearing is seated against shoulder in bore.
3. At outside of case install beveled retaining ring in groove inside bearing bore with beveled side facing outside of case.
4. Lubricate bearing with SPORT-TRANS FLUID.

Countershaft Needle Bearing

1. Find a suitable bearing driver 1-1/4 in. (31.75 mm) in diameter.
2. From the outside of the case place the needle bearing open end first next to the bearing bore. Hold the driver squarely against the closed end of the bearing and tap the bearing into place. The bearing is properly positioned when it is driven inward flush or 0.030 in. (0.762 mm) below the outside surface of the case.
3. Lubricate bearing with SPORT-TRANS FLUID.

Shift Drum Needle Bearing

1. Find a suitable bearing driver 13/16 in. (20.64 mm) in diameter.
2. From the outside of the case place the needle bearing, open end first, next to the bearing bore. Hold the driver squarely against the closed end of the bearing and tap the bearing into place. The bearing is properly positioned when driven inward flush or 0.030 in. (0.762 mm) below the outside surface.
3. Lubricate bearing with SPORT-TRANS FLUID.

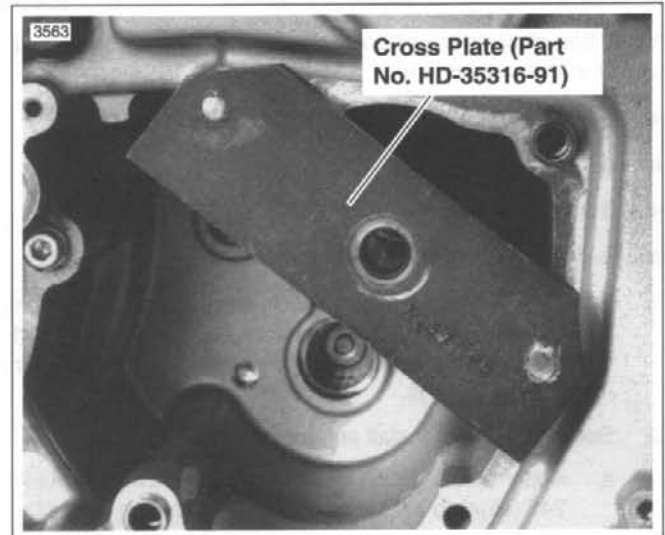


Figure 6-58. Cross Plate Mounting

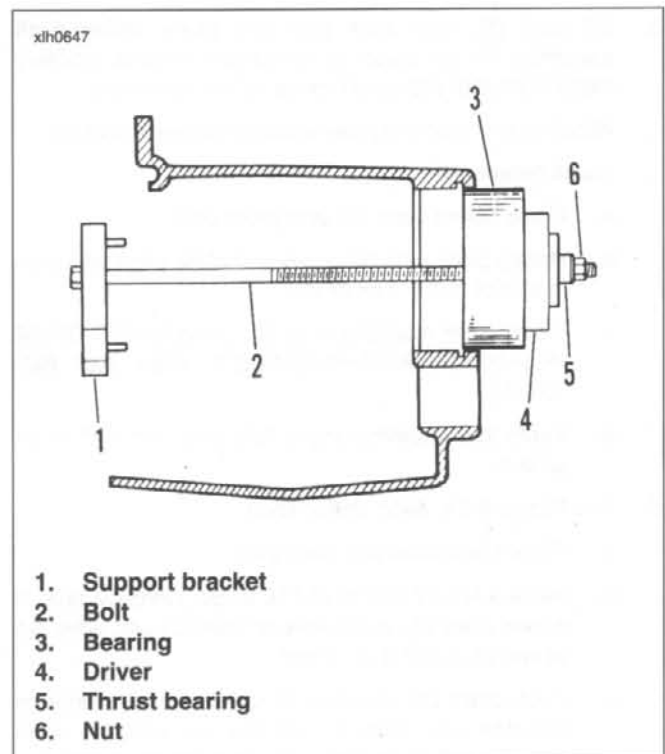


Figure 6-59. Installing Mainshaft Ball Bearing

TRANSMISSION INSTALLATION AND SHIFTER PAWL ADJUSTMENT

6.13

Verify that all parts have been properly installed, as described earlier in this section under:

- 6.12 RIGHT TRANSMISSION CASE BEARINGS
- 6.10 MAIN DRIVE GEAR
- 6.9 MAINSHAFT AND COUNTERSHAFT
- 6.8 SHIFTER FORKS AND DRUM

1. Carefully insert transmission into case opening. Position the assembly so that the mainshaft enters fifth gear, and so that the countershaft and drum shifter shaft enter their respective bearings.
2. See Figure 6-60. Install access door.
 - a. Apply a few drops of **LOCTITE THREADLOCKER 243** (blue) to all five access door mounting bolts (7).
 - b. Insert bolts through access door into tapped holes in right transmission case.
 - c. Tighten to 13-17 ft-lbs (17.6-23.0 Nm).
3. Lift pawl (5) over drum pins and place shifter shaft assembly (6) on studs at transmission case. Loosely install a washer (10) and locknut (3) on each stud.
4. Attach loop of spring (1) over and into groove in post (2).
5. Install detent plate.
 - a. Place detent plate (8) over drum pins.
 - b. Rotate plate until blind holes in plate align with pins in end of shifter fork drum.
 - c. Install **new** retaining ring (9) using **SHIFT DRUM RETAINING RING INSTALLER** (Part No. HD-39151).
 - d. Verify that retaining ring is fully engaged with drum groove.
6. See Figure 6-61. Align shifter shaft.
 - a. Place transmission in third gear.
 - b. Place a No. 32 drill bit (0.116 in. dia.) through hole in detent plate (3), and between pawl (2) and drive pin at end of shifter drum shaft.
 - c. Push down top of crank (4) to remove all clearance between pawl and drill bit; this will correctly align pawl to shift drum pins (do not push down with too great a force, as this might cause the shifter drum to rotate).
 - d. With bit in place, tighten shifter shaft assembly bottom locknut (1) first to 90-110 **in-lbs** (10.2-12.4 Nm). Then, tighten shifter shaft assembly top locknut (1) to the same torque.
 - e. **Remove drill bit.**
7. See Figure 6-39. Place **new** quad ring (17) over threaded end of fifth gear (21), and position next to the gear taper. Install spacer (16) over threaded end of fifth gear with chamfered end toward quad ring. Slide spacer up against bearing (19).

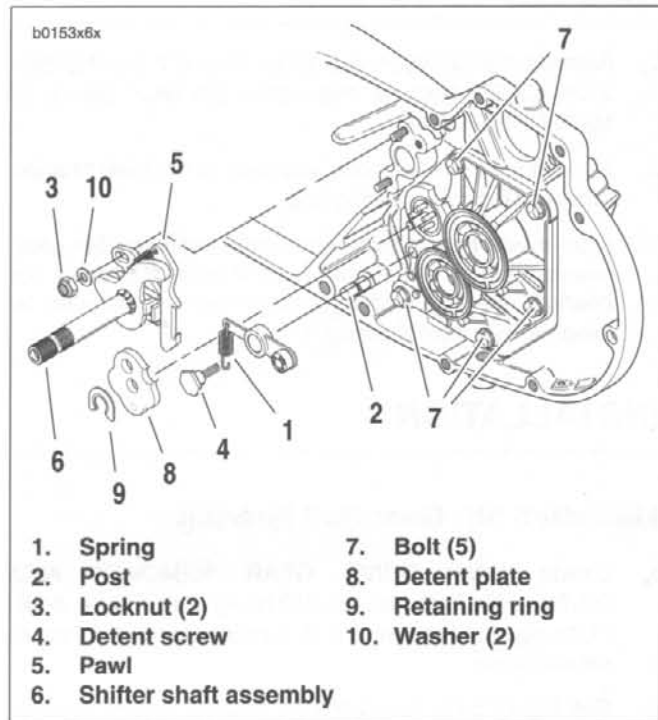


Figure 6-60. Installing Access Door

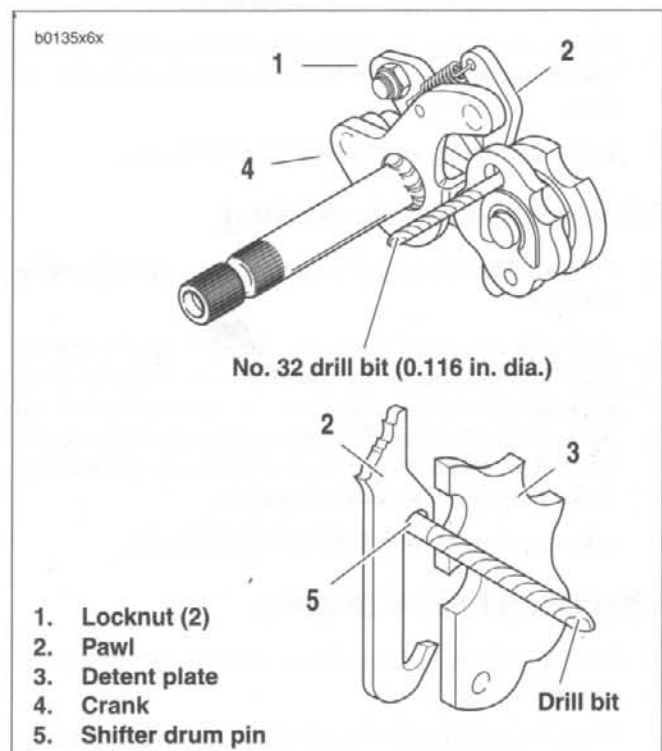


Figure 6-61. Shifter Shaft Assembly Alignment

8. Install seal.
 - a. Coat lips of seal (15) with SPORT-TRANS FLUID.
 - b. Position seal over spacer (16) with lips of seal toward case.
 - c. Gently tap seal into bore of case until the outside of seal is flush with outer edge of bore.

NOTE

It is acceptable to recess seal to about 0.030 in. (0.762 mm) below outer edge of bore. Seal recession will be limited by seal bottoming against retaining ring (18).

9. See Figure 6-62. Increase belt deflection by loosening rear axle and moving rear wheel forward. Install transmission sprocket (2) with secondary drive belt onto main drive gear shaft (1).
10. Place transmission in neutral.
11. Apply a few drops of LOCTITE THREADLOCKER 262 (red) to the **left-hand threads** of transmission sprocket nut (3). Position nut with washer-faced side facing transmission sprocket. Turn the nut **counterclockwise** to install it onto main drive gear shaft.
 - a. See Figure 6-63. Install SPROCKET HOLDING TOOL (1) (Part No. HD-41321) as shown. Use MAINSHAFT LOCKNUT WRENCH (2) (Part No. HD-94660-37B) and a torque wrench to tighten sprocket nut to 50 ft-lbs (67.8 Nm) INITIAL TORQUE ONLY.
 - b. See Figure 6-64. Scribe a line on the transmission sprocket nut and continue the line on the transmission sprocket as shown.
 - c. Tighten the transmission sprocket nut an additional 30°-40°.
 - d. See Figure 6-62. Install lockplate (4) over nut (3) so that two of lockplate's four drilled holes (diagonally opposite) align with sprocket's (2) two tapped holes.

NOTE

The lockplate has four screw holes and can be turned to either side, so you should be able to find a position without having to additionally tighten the nut. If you cannot align the screw holes properly, the nut may be additionally TIGHTENED until the screw holes line up, but do not exceed 45° as specified above. Never LOOSEN nut to align the screw holes.

- e. See Figure 6-64. If lockplate will not align with holes, tighten nut to 45° maximum.

CAUTION

Maximum allowable tightening of sprocket nut is 45° of counterclockwise rotation, after initially tightening to 50 ft-lbs. Do not loosen sprocket nut while attempting to align the screw holes. If you cannot align lockplate and sprocket screw holes, nut may be additionally tightened 45° as specified above. Tightening too much or too little may cause the nut to come loose during vehicle operation which may result in vehicle damage.

12. If you cannot align lockplate and sprocket screw holes, nut may be additionally tightened until screw holes align.

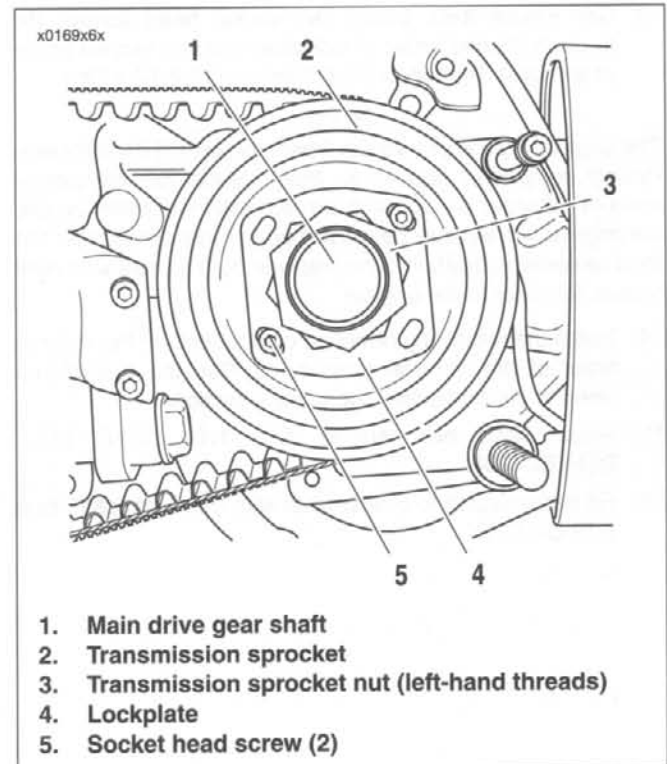


Figure 6-62. Transmission Sprocket

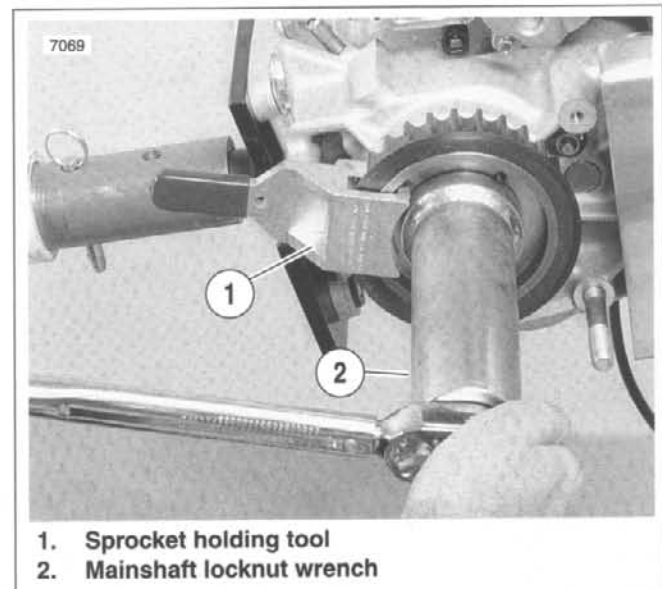


Figure 6-63. Transmission Sprocket Tightening

13. See Figure 6-62. Install two socket head screws (5) through aligned holes of lockplate and into tapped holes of sprocket. Tighten to 90-110 **in-lbs** (10.2-12.4 Nm).

NOTE

*The original equipment socket head screws (5) have thread-locking compound applied to them. Since this compound remains effective for about three removal/installation cycles, the original screws may be reused up to three times. After the third removal/installation cycle, replace both screws with **new** screws identical to the original.*

14. Install the remaining removed components in the reverse order of the removal procedures. See the procedures listed in the respective component sections.
15. Adjust drive belt tension. See 1.13 REAR BELT DEFLECTION.
16. Fill transmission to proper level with fresh lubricant. See 1.12 CLUTCH.

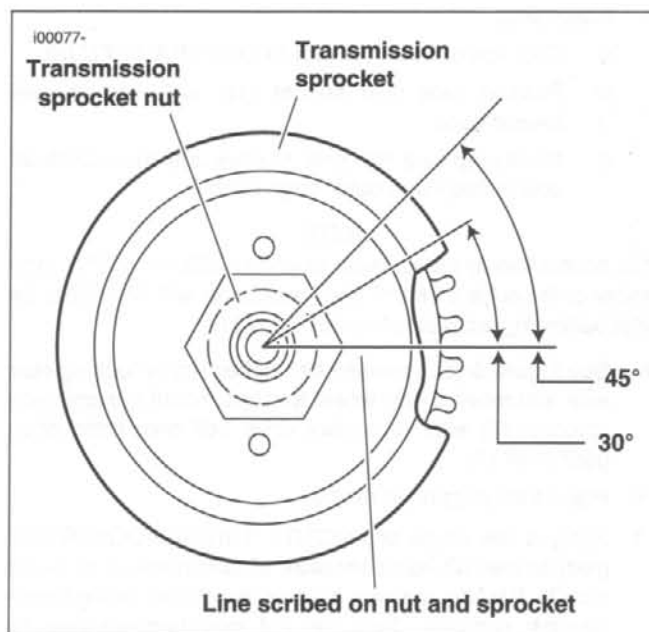


Figure 6-64. Aligning Transmission Sprocket